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FULLY PROCEDURALIZED INSTRUCTION MANUAL FOR A CHEMILUMINESCENT OZONE MONITOR

Richard L. Dueker

Applied Science Associates, Incorporated

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The report is a "Fully Proceduralized Instruction Manual for a Chemiluminescent Ozone Monitor." The manual was written using the Job Performance Aid (JPA) concept. It was produced to demonstrate the application of the JPA type fully proceduralized concept to automatic air monitoring instrument manuals. The concept is one of the latest advancements in technical manuals and is basically an aid in the performance of the job of maintenance, troubleshooting, and repairing continuous air monitors.

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Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, N.C. 27711

January 1974

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SOME THINGS YOU SHOULD KNOW ABOUT THIS BOOK

As you will see from the Table of Contents, this manual covers such topics as Installation, Calibration, Troubleshooting, and Corrective Maintenance tasks done on the Bendix Ozone Monitor. You won't need to be an electronics expert to use this book. Servicing procedures outlined here are simple, step-by-step sequences, and require only that you possess fundamental skills like being able to solder a wire and read a voltage-ohm meter.

If you are in doubt about whether you are qualified to perform the procedures in this manual, read the technician requirements beginning on page 8-21.

What Is a Job Performance Aid?

This manual was written using the Job Performance Aid concept.

A Job Performance Aid (or JPA for short) is one of the latest advancements in technical manuals. It is a tool as important to you as any in a tool kit. JPA is the result of many years of research in maintenance communications. Basically, JPA is an AID to you in the Performance of the Job of troubleshooting and repair. When it was written, nothing was left to chance and the writers covered every known problem you can expect to see. In a single volume it tells how to quickly and completely checkout the Bendix Ozone Monitor Model 8002, and then gives you step-by-step procedures to use for adjustment or repair.

The manual is large because the combination of checking and troubleshooting procedures used in this book results in a great many steps. Under actual working conditions, however, the number of steps to be performed to correct any one malfunction will be relatively small. You'll only need to use a portion of the book to solve an everyday problem.

Maintenance Tasks

The maintenance tasks in this manual are divided into separate sections covering installations, operation, calibration, preventive maintenance (i.e., replacement of filters), and corrective maintenance (i.e., replacement of faulty parts). All of the maintenance tasks in these sections are arranged in the same way. The first page of each task is the Input Conditions Page which lists the special tools and the supplies required to perform the task. Where no special tools and equipment are listed, you can assume that only common hand tools (i.e., pliers, open end or adjustable wrenches, screw drivers, etc.) are required for the job. The Input Conditions Page also describes equipment conditions i.e., the state that the monitor must be in before the task can be performed. For example, some tasks require that the monitor be at its stable operating temperature, or calibrated, before they are performed.

Following the Input Conditions Page, the step-by-step procedure for performing the task is presented. Task steps and illustrations are presented on the same page. Each pair of facing pages contains all the illustrations required to perform the steps on those pages. The JPA will never ask you to go to another page for an illustration.

When a part is referred to in a step, it is usually followed by a number in parenthesis. An arrow with this number will point out the part in the illustration.

When gauges or switches are contained in the illustration, don't rely on the drawing for the correct settings. The text will give you the necessary numbers for setting or reading the controls.

Troubleshooting

The heart of this manual is the troubleshooting section, Section 6. The information in Section 6 will allow you to identify a problem in the Ozone Monitor and then proceed to locate the part that is at fault. Every field-replaceable part in the monitor, should it malfunction, can be found using the troubleshooting procedures.

The Troubleshooting Section begins with a checkout procedure. Except for installation and operation, all maintenance tasks should begin with the checkout. If anything is wrong with the monitor, the checkout will detect it and refer you to a troubleshooting procedure further along in the troubleshooting section. The troubleshooting procedure will lead you to the part that is faulty, and if necessary, direct you to the Corrective Maintenance Section for the proper procedure to replace the part. Most of the part replacement tasks are so simple that corrective maintenance tasks were not written for them. In these cases, the last step in the Troubleshooting Procedure will just say "Replace (part name)."

When you have performed the corrective maintenance procedure required for a "fix," it's good practice to run through the checkout again, beginning at Step 1. If you can get through the checkout procedure from beginning to end without discovering another problem, you are assured that the monitor is working perfectly.

Specific directions for performing troubleshooting are given at the beginning of the Troubleshooting Section, page 6-1.

Supporting Data

Technical data which may be helpful to you, but which is not immediately needed in performing the maintenance and troubleshooting procedures is placed in the last section of the manual. Parts lists and parts ordering information are in the Supporting Data Section. Also included in this section is a specification of all the parts and equipment, in addition to the monitor itself, which are required to install, operate, and calibrate the monitor. You should read this subsection, beginning on page 8-23, before working with the monitor.

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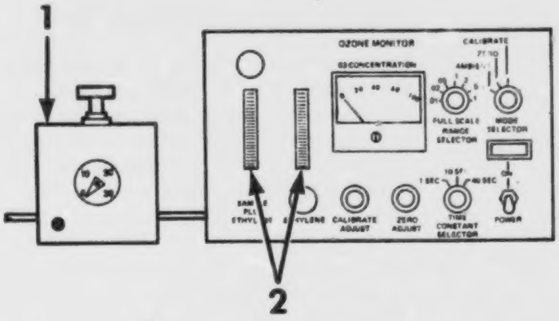
MODEL MODIFICATIONS COVERED

THIS MANUAL COVERS THE FOLLOWING BENDIX OZONE MONITOR, MODEL 8002, MODIFICATIONS:

MOD A

The earliest Model 8002 monitors had a separate unit, the Ethylene Flow Box (1) which contained an ethylene pressure regulator, pressure gauges, and the diverter valve for checking the ethylene flow rate. The box was installed between the ethylene cylinder and the ethylene inlet on the ozone monitor. The MOD A monitor has two flow meters (2) on its front panel.

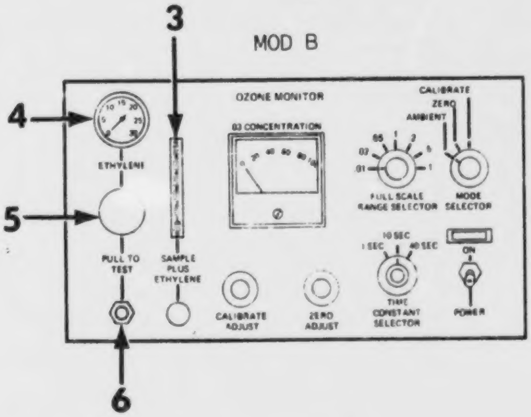
MOD A


1
OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
1 SEC
10 SEC
40 SEC
ON
SAMPLE PLUS ETHYLENE
ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
2

MOD B

The MOD B monitor is similar to the MOD A except that all components are located within the monitor. The front panel of the MOD B contains one flowmeter (3), ethylene pressure gauge (4), pressure regulating knob (5), and the diverter valve (6).

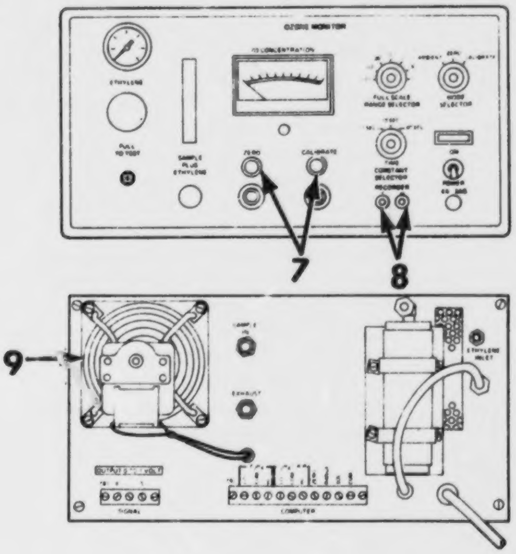
MOD B


3
4
5
6
OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER

MOD C

The outside appearance of the MOD C is similar to the MOD B--the differences are internal. The MOD C can be identified by the presence of zero and calibrate lights (7) and recorder terminals (8) on the front panel and the cooling fan (9) mounted externally on the rear panel.

MOD C


OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
ZERO
CALIBRATE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
TIME CONSTANT SELECTOR
RECORDER
ON
POWER
7
8
9
EXHAUST
ETHYLENE INLET
SIGNAL
COMPUTER

PRINCIPLES OF OPERATION

General Theory of Operation

The Bendix Ozone Monitor samples the ambient air, detects the presence of any ozone in the sample, and indicates the amount of ozone in the air on its front-panel meter (or on a chart recorder). An air pump in the unit constantly pulls in ambient air for sampling. The unit reacts quickly to changes in the amount of ozone in the air, providing an accurate reading within 10 seconds after a change occurs in the intake sample.

The basic operating principle is this: when ozone is mixed with ethylene gas, "chemiluminescence" occurs. This means that the ozone and ethylene react chemically to produce light. In the monitor, a controlled amount of ethylene gas is mixed with the samples of air pulled in by the air pump. If any ozone is present in the air sample, the chemiluminescence reaction occurs. A light-sensitive photomultiplier tube senses the light, and produces an output current which is amplified to drive the panel meter. If the quantity of ozone in the air sample increases, more light is produced, causing a higher output current from the photomultiplier tube, and hence a higher meter reading. If the ozone quantity decreases, less light is produced, and the tube's output current drops, lowering the meter reading. If no ozone at all is present in the air, no light is produced, and the meter reads zero.

Refer to Figure I, which shows the flow paths for the air samples and the ethylene gas, for all three modes of operation--ZERO, CALIBRATE, and AMBIENT (or NORMAL).

ZERO Mode of Operation. This mode is used to zero the Ozone Concentration meter. In this mode, the Selector Solenoid is energized, connecting the Ozone Generator output to the Reaction Chamber. The evacuation pump pulls air in through the Chemical Filter (molecular sieves, activated charcoal, and indicating silica gel), Ozone Generator, Selector Solenoid, and Reaction Chamber. The Ozone Generator is not energized, so only ozone-free air reaches the Reaction Chamber. Since no ozone is present, no chemiluminescence occurs, and the photomultiplier tube operates at its "complete darkness" level, producing only a very small output current. If left uncompensated, this current would produce a slight meter reading, so the Zero Adjust Control is provided to counteract the voltage and set the meter to "0."

CALIBRATE Mode of Operation. This mode is used to set the monitor for accurate readings. In this mode, the Selector Solenoid is again energized, with the intake air flow path the same as for the ZERO mode. But in this mode the Ozone Generator is energized, and produces a known quantity of ozone. In the Reaction Chamber, the ozone-bearing air and ethylene gas are mixed, and chemiluminescence occurs. Since the Ozone Generator is providing a known amoutn of ozone, the Calibrate Adjust Control can be used to set the Ozone Concentration Meter to the correct reading, as determined by secondary calibration (see page 4-9).

AMBIENT (or NORMAL) Mode of Operation. In this mode the instrument continuously monitors the ambient air. The Selector Solenoid is de-energized, so that the Evacuation Pump now pulls air in through the Teflon Filter and Selector Solenoid and into the Reaction Chamber. If there is any ozone in the air, it will react with the ethylene in the Reaction Chamber, producing an amount of light proportional to the quantity of ozone. The

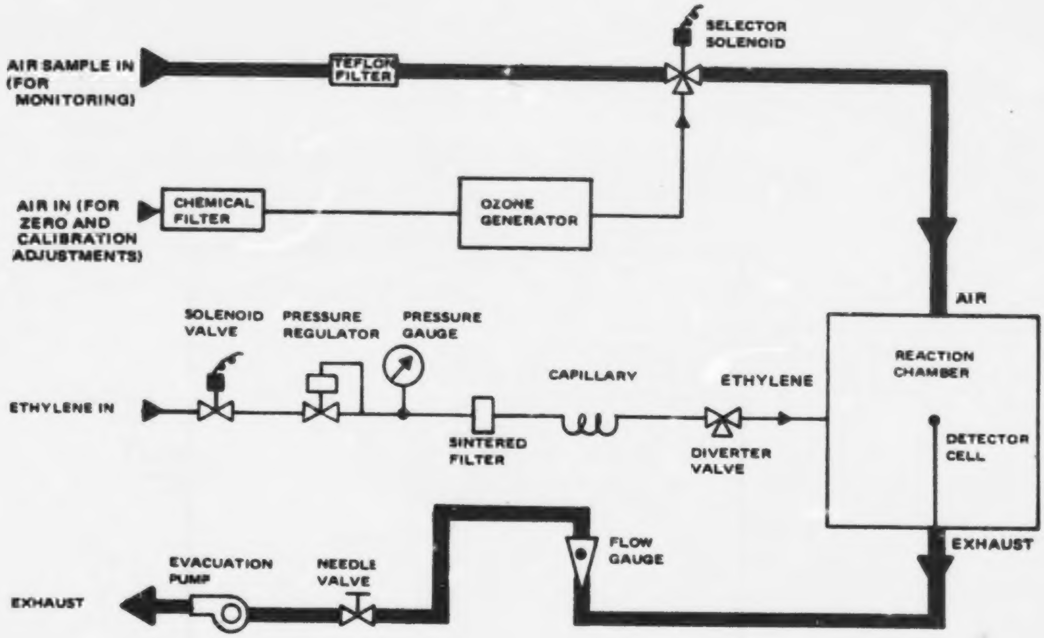

SELECTOR SOLENOID
AIR SAMPLE IN (FOR MONITORING)
TEFLON FILTER
AIR IN (FOR ZERO AND CALIBRATION ADJUSTMENTS)
CHEMICAL FILTER
OZONE GENERATOR
AIR
SOLENOID VALVE
PRESSURE REGULATOR
PRESSURE GAUGE
REACTION CHAMBER
ETHYLENE IN
CAPILLARY
ETHYLENE
SINTERED FILTER
DIVERTER VALVE
DETECTOR CELL
EXHAUST
FLOW GAUGE
EVACUATION PUMP
NEEDLE VALVE
EXHAUST

Figure 1. Ozone Monitor Air Sample and Ethylene Gas Flow

photomultiplier tube senses the light, and produces an output current proportional to the amount of light. This current then operates the Ozone Concentration meter.

Ethylene Flow. The ethylene gas flow into the Reaction Chamber is the same regardless of the operating mode. The ethylene, supplied from an external cylinder, undergoes filtration and pressure regulation before reaching the Reaction Chamber. This processing is necessary to maintain the high accuracy of the ozone monitor.

OPERATION OF SPECIFIC COMPONENTS

Detector Cell Assembly

Refer to Figure 2. The Detector Cell consists of the Reaction Chamber and the Photomultiplier Tube Assemblies. Air samples and ethylene are continuously mixed together in the Reaction Chamber and, if ozone is present, chemiluminescence occurs, producing light. The light passes through the air-tight Glass Window to the Photosensitive Coating on the Photomultiplier Tube where it is converted to electrical current. The sample and ethylene leave the Reaction Chamber through the exhaust port, pass through the evacuation pump, and exhaust to the outside air. The design of the chamber and the location of input and exhaust ports minimize the measurement lag time to less than three seconds.

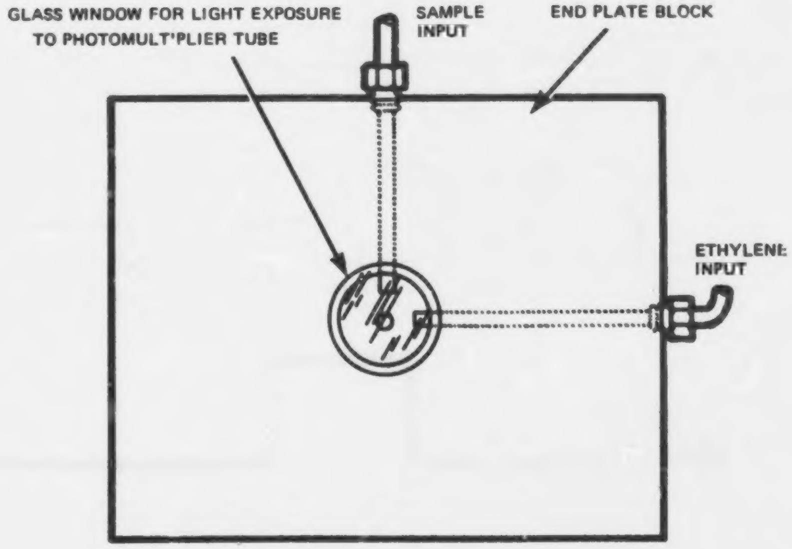


Figure 2. Detector Cell Assembly

Photomultiplier Tube Assembly

Refer to Figure 3. The function of this assembly is to sense any chemiluminescent light generated in the Reaction Chamber, and provide a proportional current to operate the Ozone Concentration meter. The Photomultiplier Tube is in a factory-sealed housing that provides a completely dark, low-temperature environment for the tube. Since the tube is light-sensitive, it must be operated in absolute darkness. Since it is also temperature-sensitive, it must have a low-temperature (+5° C) environment for stable operation. The low-temperature environment also reduces the tube's steady-state current, thereby increasing its sensitivity.

The photomultiplier tube consists of three basic types of elements; the cathode, the dynodes, and the anode. The cathode is photosensitive and produces free electrons when it is excited by light. The dynodes are treated with a special coating to produce "secondary emission"; that is, when free electrons strike the surface they release a greater quantity of electrons. When light from the Reaction Chamber strikes the photo-sensitive cathode, electrons are released which are attracted to the adjacent element, a dynode, since it is held at a more positive (or less negative) potential. Due to the secondary emission effect, a larger quantity of electrons are released and attracted to the next dynode. This process is repeated with a series of dynodes, each of which is increasingly more positive (or less negative) than the previous dynode; thus electronic multiplication or amplification occurs, assisted by circuits on the Photomultiplier Assembly PC Board. The electrons from the last dynode, eleventh, are attracted to the anode which is the most positive element of

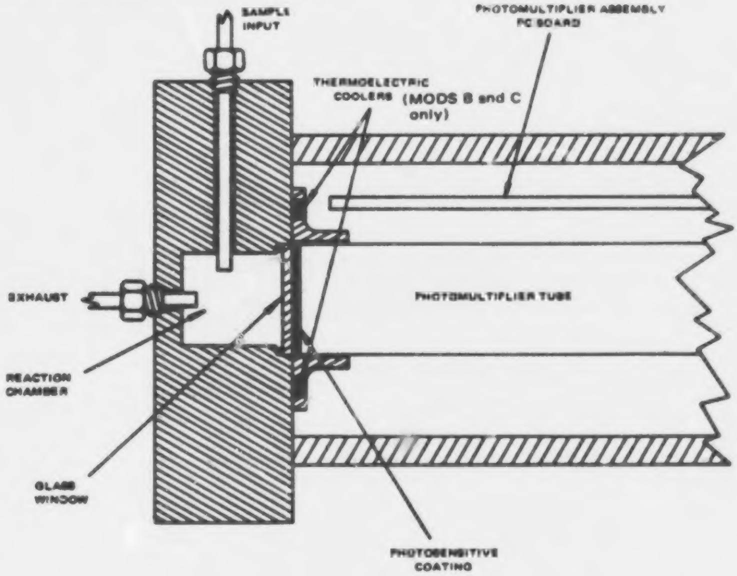


Figure 3. Photomultiplier Tube Assembly

the tube and functions as the final collector of the free electrons.

Output current from the anode is coupled to the Electrometer Amplifier PC Board, which provides the necessary drive voltage for the Ozone Concentration meter, and chart recorder output.

Ozone Generator Assembly

Refer to Figure 4. The basic operating principle of the Ozone Generator is that oxygen molecules (O_2) exposed to ultraviolet light change to ozone molecules (O_3), in proportion to the intensity of the light. Therefore, passing air that is to be used for a calibration sample past an ultraviolet lamp operating at the appropriate intensity converts a definite portion of the O_2 molecules to O_3.

The Ozone Generator consists of an Ultraviolet Lamp inside a Slotted Sleeve, with an adjacent quartz tube that conducts the calibration air sample. The position of the Slotted Sleeve is set at the factory to provide the reading specified on the data sheet which accompanies each ozone monitor unit. The sleeve may be readjusted, if required (see page 6-27).

Specifications

The minimum performance specifications for the Ozone Monitor are presented below. The system will operate within these stated performance parameters under the conditions listed.

Operational Period:
Mod A & Mod B--7 days unattended.
Mod C--7 or more days unattended.

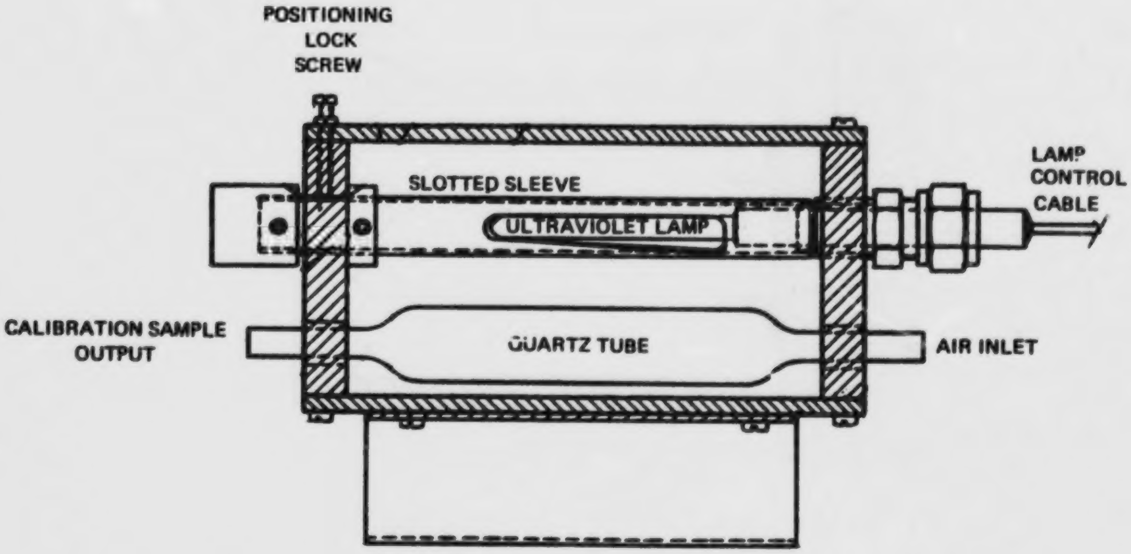


Figure 4. Mods B & C Ozone Generator

Operating Temperature Extremes:
5° and 40° C.

Ambient Temperature Fluctuations:
± 5° C.

Humidity Range:
10% to 95% relative humidity

Power Line Variations:
105 to 125 volts ac.

Measurement Ranges:
0 to 0.01, 0.02, 0.05, 0.1, 0.2, 0.5 and 1 ppm full scale.

Minimum Detectable Sensitivity:
0.001 ppm.

Noise:
≤ ± 1% on the 0 to 0.1 ppm range.

Lag Time:
≤ 3 seconds.

Response Time:
≤ 7 seconds to reach 90% of ultimate indication.

Rise and Fall Time:
≤ 10 seconds to reach 90% of ultimate indication after input change (lag time plus response time).

Zero Drift:
Mod A & Mod B--3%/24 hours and not to exceed 5%/week on 0 to 0.1 ppm range.

Mod C--± 1%/24 hours or ± 2%/36 hours.

Span Drift:
Mod A & Mod B--Same as "Zero Drift" except with stated upscale value.

Mod C--± 1%/24 hours or ± 2%/36 hours.

Measurement Repeatability:
± 2% from mean value on the 0 to 0.1 ppm range.

Interference Equivalent:
≤ 0.01 ppm.

Linearity:
± 0.5%.

Total Variations:
≤ 5% of full scale/24 hours with ± 5° C variations utilizing the 0 to 0.1 ppm range.

Time Constants:
1, 10 and 40 seconds.

Output:
Mod A & Mod B--0 to 100 mV full scale (for recorder).

Mod C--0 to 10 mV (recorder) and 0-1 VDC (other outputs optional).

Power Requirements:
350 watts @ 125 volts, 60 Hz (50 Hz optional).

SECTION 2. INSTALLATION

INSTALL THE OZONE MONITOR

INPUT CONDITIONS

Introduction

The Installation activity includes setting up the Ethylene supply and External Ozone Generator systems and connecting them to the Ozone Monitor. It includes connecting the sample and exhaust lines and the chart recorder. When all connections have been made, the Monitor is checked for leaks. This activity should always be followed by a primary calibration of the Ozone Monitor using the Neutral Buffered Potassium Iodide Reference Method. Refer to page 8-15.

Applicable Mods:

All

Special Tools and Test Equipment:

Refer to page 8-13.

Supplies:

Liquid Leak Detector Solution
Ethylene Cylinder, Containing CP
  Grade Ethylene
Air Cylinder or Air Pump

Personnel Required:

One Technician

Equipment Conditions:

Ozone Monitor removed from shipping crate and inspected for visible damage.

WARNING

Exercise extreme caution when performing the following installation due to the explosive properties of ethylene gas when subjected to rapid temperature rises. Make certain that all connections are mated properly so that gas leakage does not occur.

CAUTION

Avoid use of Tygon tubing in the Sample Introduction and Calibration Sample Systems.

CAUTION

To avoid damage to fittings in Monitor, teflon fitting should be tightened finger tight. Metal fittings should be tightened finger tight plus 3/4 turn with a wrench.

CAUTION

When using leak detector solution, do not spill solution on electrical components or connections.

WARNING

Use extreme caution when performing check. Power is applied to the monitor and electric shock is possible.

1. Check that ethylene cylinder (1) contains CP grade ethylene.

2. Rotate ethylene pressure regulating control (2) counterclockwise until it turns freely.

NOTE

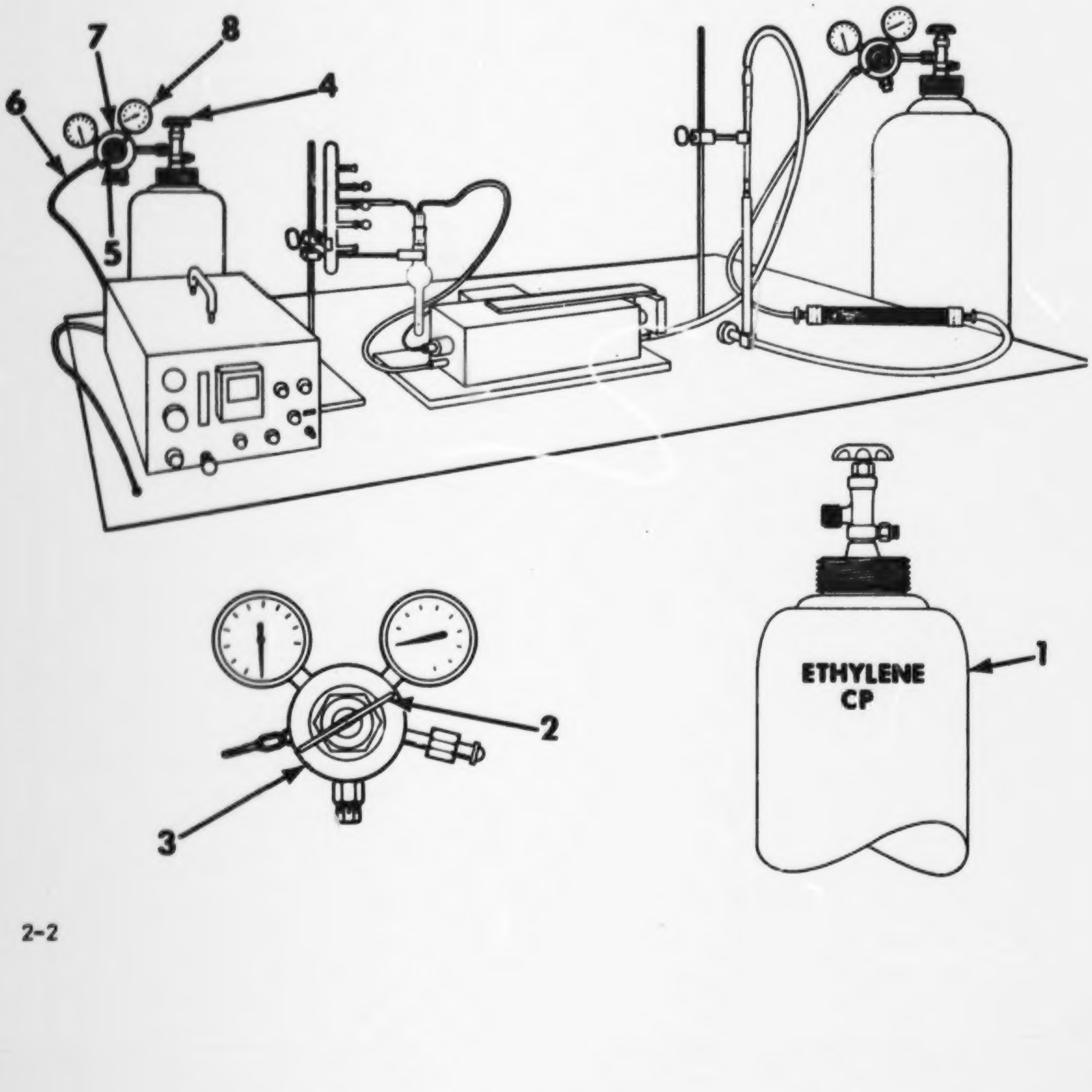
The two stage ethylene regulator is secured to the ethylene cylinder with a left hand threaded nut.

3. Connect two stage regulator (3) to ethylene cylinder (1).

4. Connect stainless steel tubing (6) to ethylene regulator (7).

NOTE

Be sure stainless steel tubing is routed in such a manner as to prevent unnecessary strain on tubing and connections. Avoid sharp bends in tubing which could restrict ethylene flow. Provide sufficient excess tubing to permit access to rear panel of monitor.



NOTE

If installing MOD A, connect stainless steel tubing to Ethylene Flow Box. Connect flow box outlet to ETHYLENE INLET fitting on monitor with tubing provided.

5. Connect opposite end of steel tubing (6) to ETHYLENE INLET fitting (9) on monitor.

6. Remove four screws (10) and top cover (11).

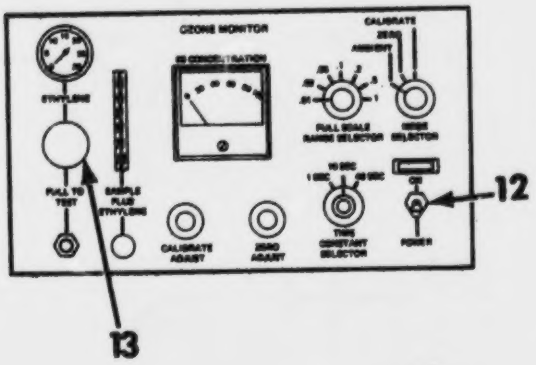
7. Connect monitor power plug to 115 VAC, 60 Hz line.

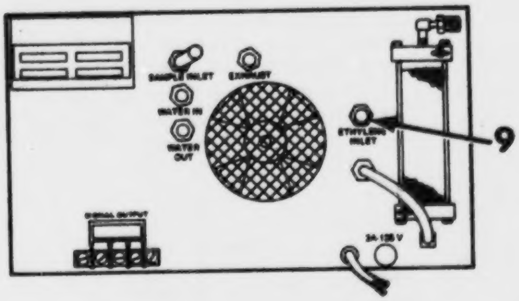
8. Set POWER switch (12) to ON.

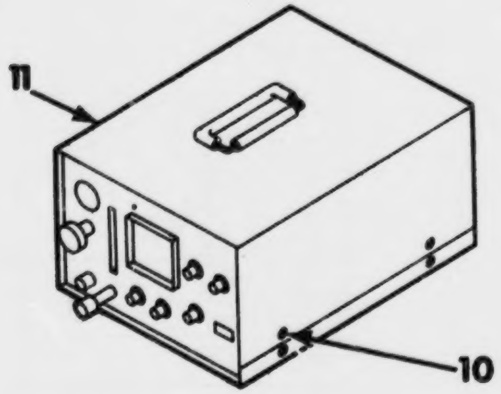
9. Slowly rotate ethylene cylinder valve (4) counterclockwise until pressure is indicated on cylinder gauge (8).

10. Adjust regulator control (5) to obtain output pressure of 30 psi.

11. Adjust ETHYLENE control (13) to pressure indicated on Supplied Data Sheet.


OZONE MONITOR
CALIBRATE
ZERO
AMBIENT
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE
ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
1 SEC
10 SEC
TIME CONSTANT SELECTOR
ON
POWER
12
13


SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
9



NOTE

If installing MOD a, adjust ETHYLENE control on Ethylene Flow Box to pressure indicated on Supplied Data Sheet.

CAUTION

When using leak detector solution, do not spill solution on electrical components or connections.

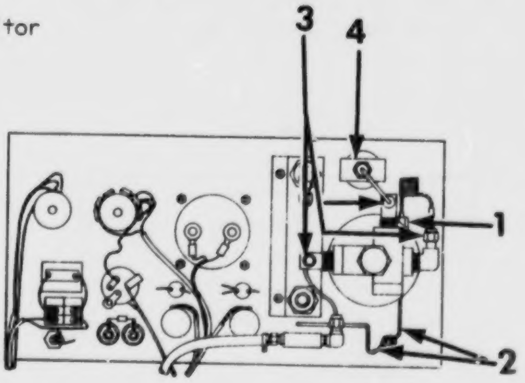
WARNING

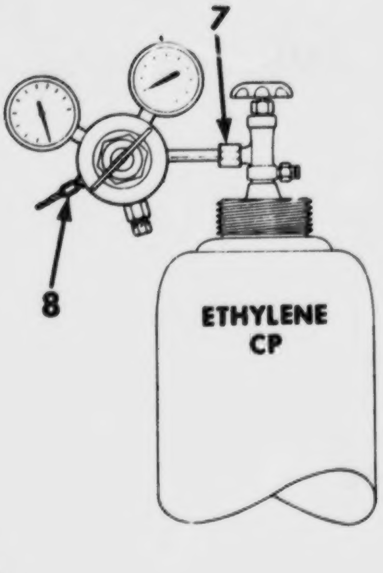
Use extreme caution when preforming check. Power is applied to the monitor and electric shock is possible.

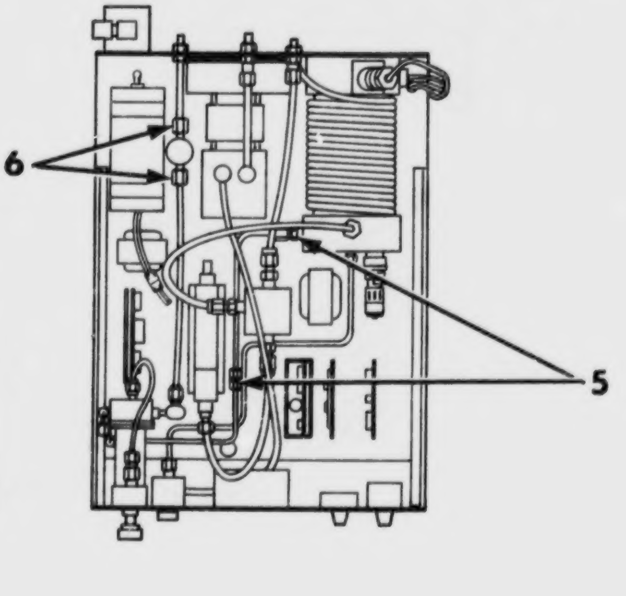
12. Using leak detector solution, check that fittings on the ethylene cylinder (7), ethylene regulator (8), ethylene input (14), ethylene solenoid valve (6), pressure regulator (3), pressure gauge (4), capillary tube (1), diverter valve (2), and diverter valve and detector cell tubing (5) do not leak. Repair or replace any leaking ethylene connections.

Note

If either diverter valve connection (2) is found to leak, replace diverter valve.







Note

On MOD A instruments, the pressure regulator, pressure gauge, capillary tube, and diverter valve are in the ethylene flow box, external to the monitor. Check the fittings on these components and also the flow box input and output fittings. Inside the monitor, check fittings at the ethylene input, and on the solenoid valve, ethylene flow meter, and flow meter to detector cell tubing.

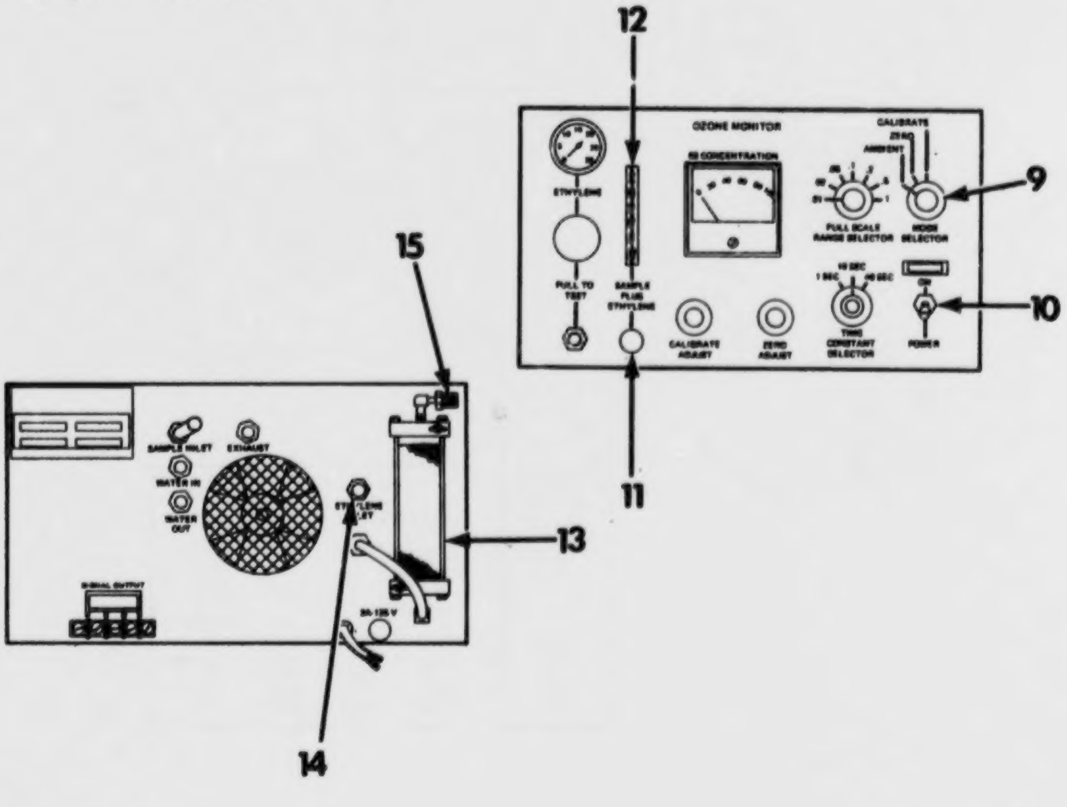
13. Set MODE SELECTOR switch (9) to ZERO

14. Rotate SAMPLE PLUS ETHYLENE needle valve (11) counterclockwise until the ball in the flow meter (12) floats at about 20% of the height of the tube.

15. Using a finger, seal off air flow at Calibration Sample Filter inlet (15). Check that SAMPLE PLUS ETHYLENE flow meter (4) slowly decreases to 0. If not, a leak exists between Calibration Sample Filter (13) and SAMPLE PLUS ETHYLENE flow meter. Refer to Check Sample and Calibration Sample Flowpaths, page 7-29.

16. Remove finger from Calibration Sample Filter inlet (15).

17. Set MODE SELECTOR switch (9) to AMBIENT.


12
OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
9
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
10
15
11
SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
13
SIGNAL OUTPUT
14

18. Using a finger, seal off air flow at SAMPLE INLET fitting (1). Check that SAMPLE PLUS ETHYLENE flow meter (3) slowly decreases to 0. If not, a leak exists between SAMPLE INLET fitting (1) and SAMPLE PLUS ETHYLENE flow meter (3). Refer to Check Sample and Calibration Sample Flowpaths, page 7-29.

19. Remove finger from SAMPLE INLET fitting (1).

20. Rotate ethylene cylinder valve (4) fully clockwise.

21. Set POWER switch (2) to OFF.

22. Reinstall top cover and secure with screws.

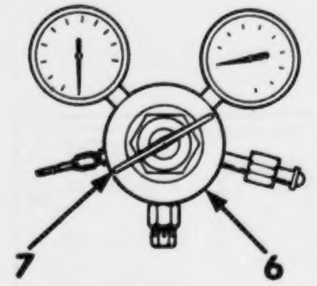
NOTE

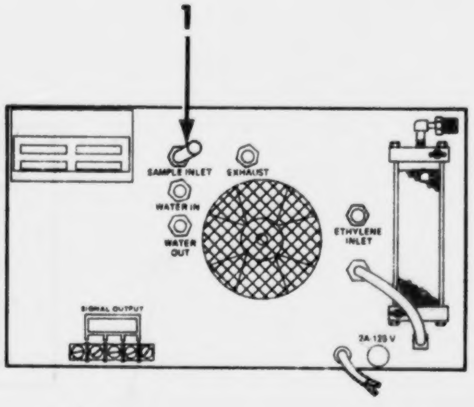
A laboratory air pump and air trap may be used in place of air cylinder and two stage regulator.

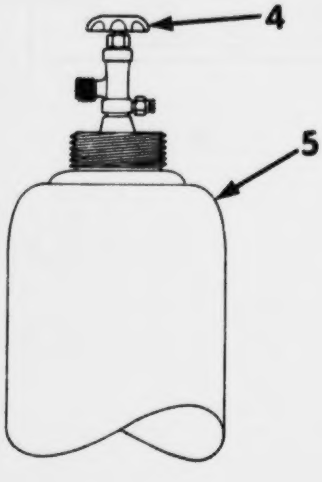
23. Check that air cylinder (5) contains lab grade air.

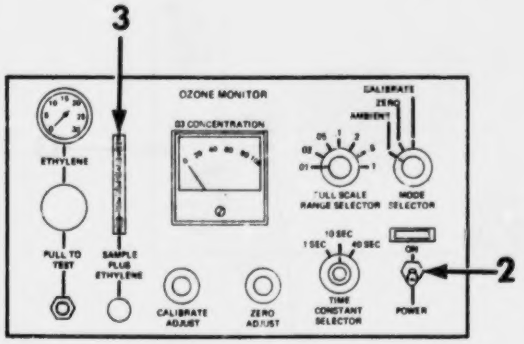
24. Connect two stage regulator (6) to air cylinder (5).

25. Rotate air pressure regulating control (7) until it turns freely counterclockwise.




1
SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
2A 125 V




3
OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
2
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER

NOTE

Use thick wall rubber tubing, 1/4" I.D., or equivalent for the following connections unless otherwise indicated.

26. Connect activated charcoal/ molecular sieve/silica gel filter (8) to air regulator output (18).

NOTE

If laboratory air pump and air trap are used, connect filter to trap output.

27. Connect filter (8) to needle valve (9).

28. Connect needle valve (9) to flowmeter input (15). Check that flowmeter (16) is mounted in a vertical position.

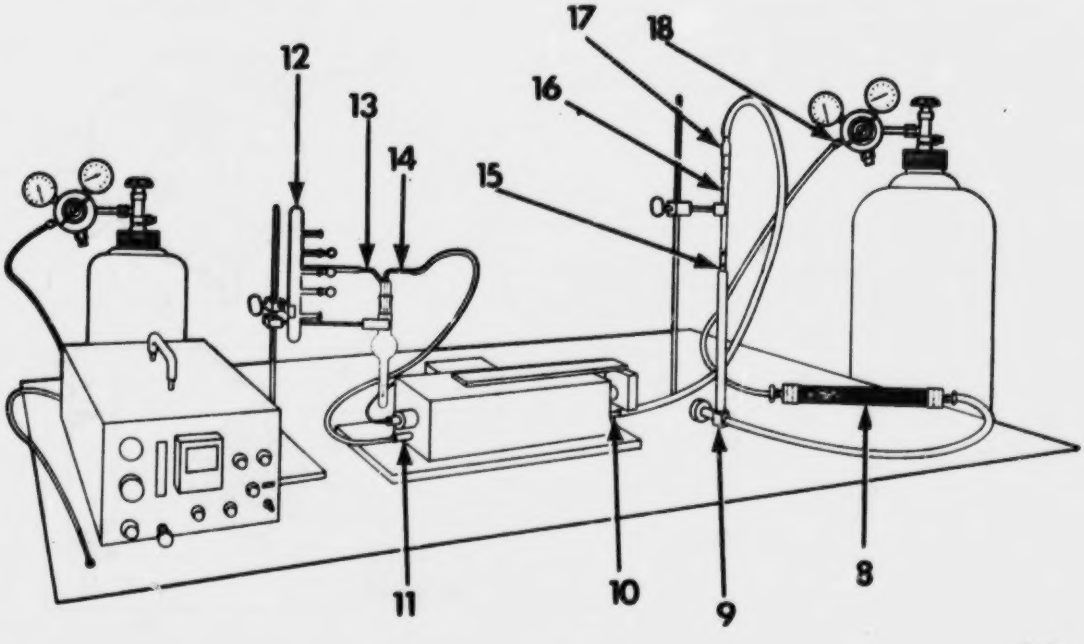
29. Connect flowmeter output (17) to Ozone Generator (10).

30. Connect Ozone Generator (11) to trap input (14) using teflon tubing.

31. Connect trap output (13) to manifold (12) using teflon tubing.

NOTE

If a selector valve is used for sample and calibration systems, connect manifold outlet to one selector valve input and the Sample Introduction System outlet to the other valve input.



32. Connect output side of teflon filter (2) to teflon tubing at SAMPLE INLET fitting (4).

NOTE

Output side of teflon filter is not marked.

33. Connect teflon tubing to teflon filter IN fitting (1).

NOTE

If a selector valve is used for sample and calibration systems, connect teflon tubing to selector valve output.

34. Connect plastic tubing to EXHAUST fitting (5) of Ozone Monitor.

35. Route EXHAUST tubing directly to an outside area at least 20 feet away from Sample Introduction System Intake Port.

WARNING

Do not route exhaust tubing near windows or inside ventilation systems. Dangerous concentrations of ethylene gas may accumulate in laboratory area.

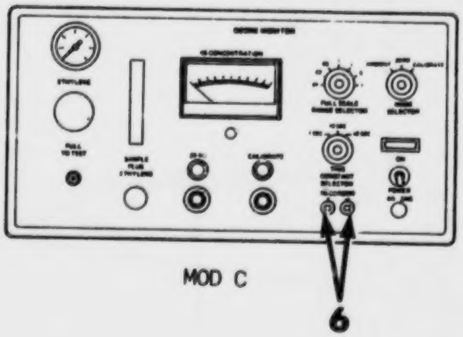
36. Connect the shielded cable to the strip chart recorder following the recorder manufacturers instructions. Be sure that the red cable lug is connected to the positive (+) recorder terminal, the black cable lug to the negative (-) recorder terminal, and the cable shield wire to the recorder ground or shield connection.

Note

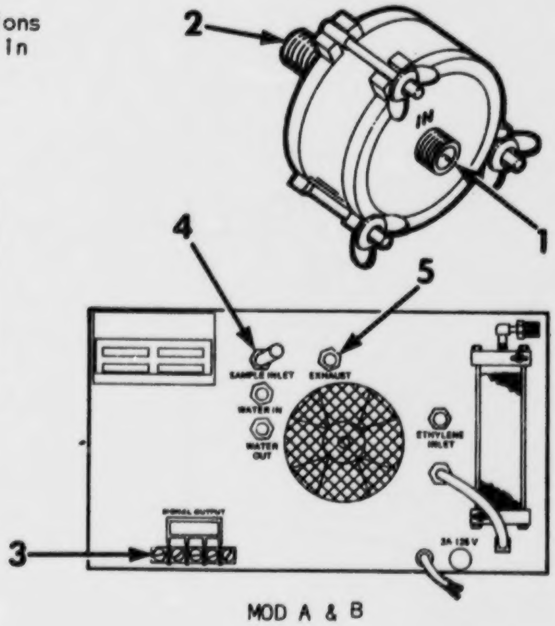
If installing a MOD A or B, use the 100mv range on the strip chart recorder. For MOD C, use the 10mv range.

37. Connect the shielded cable to the RECORDER (6) or SIGNAL OUTPUT (3) terminals on the Ozone Monitor. Be sure to connect the positive or red lead to the "+" or red terminal and the "-" or black lead to the negative or black terminal. If a shield lead is present connect to the "S" terminal.

END OF ACTIVITY


OZONE MONITOR
% CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE FLOW
FULL SCALE RANGE SELECTOR
MODE SELECTOR
6

MOD C


2
IN
1
4
5
SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
3A 125V
3

MOD A & B

SECTION 3. OPERATION

START UP THE OZONE MONITOR

INPUT CONDITIONS

Introduction

This activity describes the procedure for starting up the Ozone Monitor, including the required time for warm-up and stabilization.

Applicable Mods

All

Special Tools and Test Equipment:

None

Supplies:

None

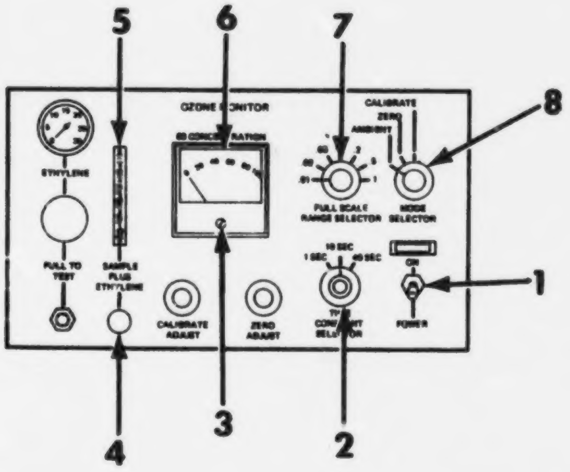
Personnel Required:

One Technician

Equipment Conditions:

Ozone Monitor installed. Refer to page 2-1.

1. Set TIME CONSTANT SELECTOR switch (2) to 10.
2. Set MODE SELECTOR switch (8) to AMBIENT.
3. Set FULL SCALE RANGE SELECTOR switch (7) to .5.
4. Adjust 03 CONCENTRATION meter (6) to 0 by rotating adjusting screw (3).
5. Set POWER switch (1) to ON.


5
6
7
8
OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
FULL SCALE RANGE SELECTOR
.01
.02
.05
.1
.2
.5
1
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
ON
POWER
1
3
2
4

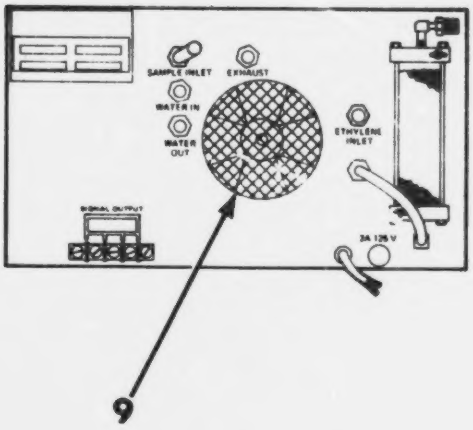
6. Rotate SAMPLE PLUS ETHYLENE needle valve (4) counterclockwise until flowmeter (5) indicates an air flow of about 20% of flowmeter tube height through Ozone Monitor.

7. Check that cooling fan (9) is operating. If not, refer to Troubleshoot the Ozone Monitor, page 6-2.

NOTE

Allow Ozone Monitor two hours to stabilize before performing calibration and operating procedures.

END OF ACTIVITY


SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
3A 125 V
9

OPERATE THE OZONE MONITOR

INPUT CONDITIONS

Introduction

This activity specifies the procedure for collecting a sample with the Ozone Monitor. The Monitor should always be calibrated, using the Internal Ozone Generator or the External generator, before it is operated.

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

Data Sheet (supplied with monitor)
Daily Check Sheet

Personnel Required:

One Technician

Equipment Conditions:

Primary Calibration performed.
Refer to page 8-15.
Start Up performed.
Refer to page 3-1.
Secondary Calibration performed.
Refer to page 4-9.
Span Check performed.
Refer to 4-1.

Preceding page blank

1. Connect SAMPLE INLET tubing (1) to Sample Inlet System.

NOTE

If a selector valve is used to select sample or calibration systems, set valve to permit flow from the Sample Introduction System.

2. Set FULL SCALE RANGE SELECTOR switch (6) to 1.

3. Set MODE SELECTOR switch (2) to AMBIENT.

4. Adjust FULL SCALE RANGE SELECTOR switch (6) until 03 CONCENTRATION meter (5) indicates approximately in center of meter scale.

NOTE

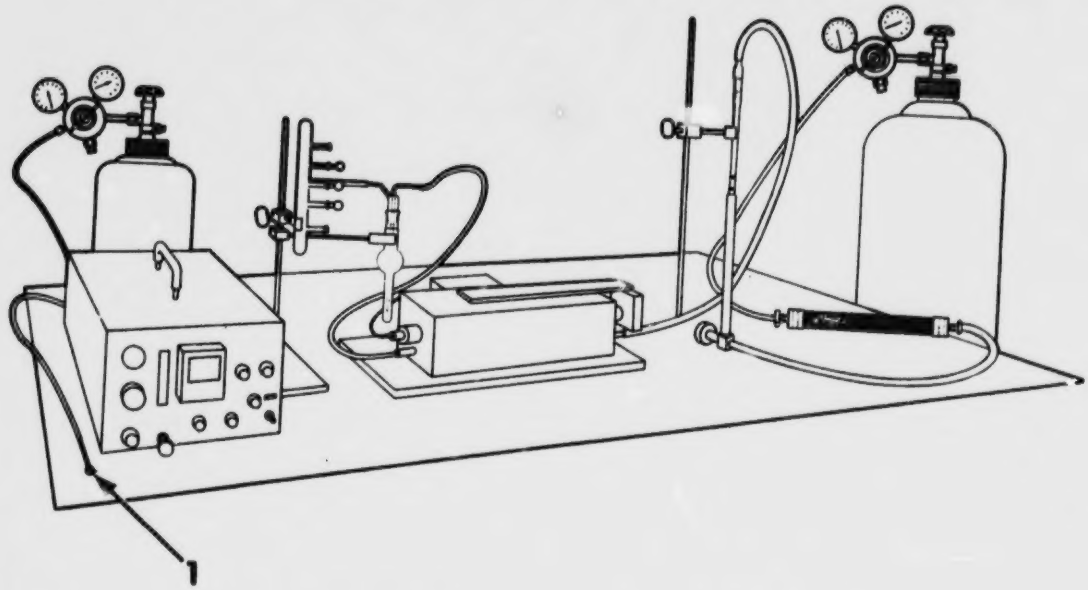
It is preferable to have meter indicate in center of meter scale, since greater accuracy is obtained in this area.

5. Record FULL SCALE RANGE SELECTOR scale (6) setting on Daily Check Sheet.

6. Adjust TIME CONSTANT SELECTOR switch (3) to 10 SEC.

NOTE

Normal operation setting for TIME CONSTANT SELECTOR switch is 10 SEC. Higher time constant setting may be necessary to stabilize meter in lower range settings.



7. Record TIME CONSTANT SELECTOR switch (3) setting on Daily Check Sheet.

8. Adjust SAMPLE PLUS ETHYLENE flowmeter (4) to value specified on supplied data sheet.

9. Record SAMPLE PLUS ETHYLENE flow rate on Daily Check Sheet.

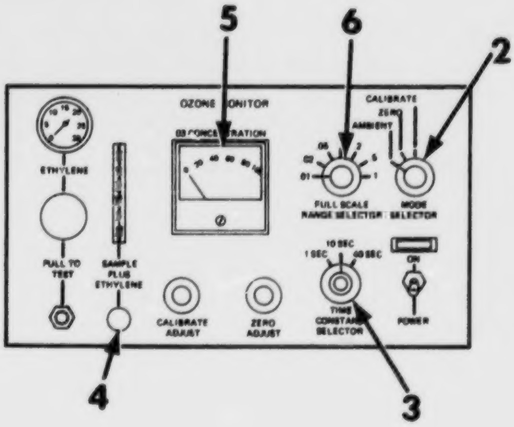
NOTE

If strip chart recorder or other automatic data recording systems are used, check for proper operating conditions according to manufacturers' specifications.

CAUTION

Do not change any control setting on the Ozone Monitor during the sampling period.

END OF ACTIVITY


5
6
2
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE
ZERO
AMBIENT
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
60 SEC
ON
POWER
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
4
3

SHUT DOWN THE OZONE MONITOR

INPUT CONDITIONS

Introduction

The following procedure should be used for turning off the Ozone Monitor and Ethylene supply system.

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

None

Personnel Required:

One Technician

Equipment Conditions:

Ozone Monitor operating.

NOTE

If Ozone Monitor is shut down for periods of more than 15 minutes, a 2-hour stabilization period is required before operation or calibration can be performed.

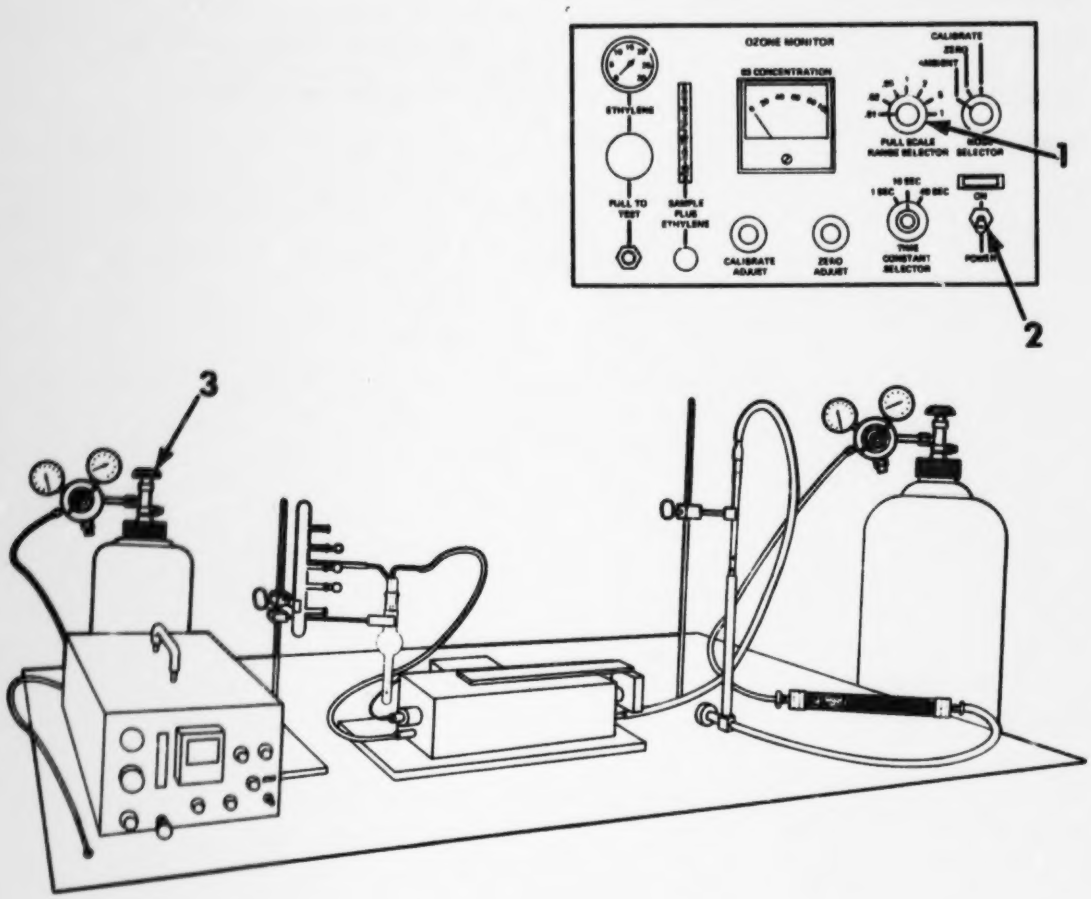
Preceding page blank

1. Set FULL SCALE RANGE SELECTOR switch (1) to 1.
2. Set POWER switch (2) to off.
3. Rotate ethylene cylinder valve (3) fully clockwise.

NOTE

If Ozone Monitor is shut down for periods of more than 15 minutes, a 2-hour stabilization period is required before operation or calibration can be performed.

END OF ACTIVITY


OZONE MONITOR
CALIBRATE
ZERO
AMBIENT
O3 CONCENTRATION
ETHYLENE
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
1
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
2
3

SECTION 4. CALIBRATION, ZERO AND SPAN

CHECK THE OZONE MONITOR ZERO AND SPAN VALUES

INPUT CONDITIONS

Introduction

This activity describes the procedure for making zero and span checks of the Ozone Monitor using the Ozone Generator within the Monitor. The procedure is normally performed before and after a sampling period and any time a quick check of the accuracy of the Monitor is desired. **Check zero and span daily.**

Applicable Mods:

All

Special Tools and Test Equipment:

Refer to page 8-13.

Supplies

Data Sheet (supplied with monitor)
Calibration Data Log

Personnel Required:

One Technician

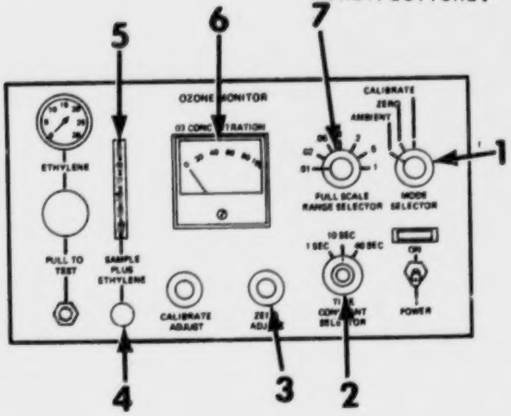
Equipment Conditions:

Ozone Monitor Start Up performed, refer to page 3-1, or Monitor in continuous operation for at least two hours.
Calibrate the Ozone Monitor Using the External Ozone Generator performed. Refer to page 4-9.

All apparatus previously assembled by a qualified chemical technician and a sampling train flowmeter calibration curve plotted.

1. Set MODE SELECTOR switch (1) to ZERO.
2. **Compare the SAMPLE PLUS ETHYLENE flowrate (5) with the flowrate given in the Supplied Data Sheet. If necessary adjust the SAMPLE PLUS ETHYLENE needle valve (4) to obtain the correct flowrate.**
3. Set TIME CONSTANT SELECTOR swith (2) to 1 SEC.
4. Set FULL SCALE RANGE SELECTOR switch (7) to .01.
5. Wait 10 minutes before proceeding.
6. Unlock ZERO ADJUST control (3). Adjust ZERO ADJUST control (3) until 03 CONCENTRATION meter indicates 0. Lock ZERO ADJUST control (3).
7. Check that the chart recorder trace is 5% of the chart width above the chart zero or baseline. If not, adjust chart recorder according to manufacturer's instructions.
8. Record ZERO ADJUST control (3) setting as required.
9. Set FULL SCALE RANGE SELECTOR switch (7) to .5.
10. Set MODE SELECTOR switch (1) to CALIBRATE.
11. Wait 10 minutes before proceeding.
12. Compare 03 CONCENTRATION meter (6) indication with the Span Check Value recorded in the Calibration Data Log for the most recent calibration. If the 03 CONCENTRATION meter (6) indication differs from the Span Check Value by more than 14%, perform Calibrate the Ozone Monitor; refer to page 4-9.
13. Check that the chart recorder indicates the same value as the 03 CONCENTRATION meter (6). Be sure to allow for the 5% elevated zero on the chart. If the values differ by an amount greater than the accuracy of the chart recorder, as given in its manufacturer's specifications, check out the recorder according to manufacturer's specifications, check out the recorder according to manufacturer's instructions.

END OF ACTIVITY


5
6
7
1
OZONE MONITOR
03 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE
ZERO
AMBIENT
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
POWER
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
4
3
2

CHECK THE EXTERNAL OZONE GENERATOR OUTPUT

INPUT CONDITIONS

Introduction

The following procedure should be performed at least once a month to check the accuracy of the External Ozone Generator. This check should be performed immediately before calibration. Refer to page 3-3.

Applicable Mods:

All

Special Tools and Test Equipment:

Spectrophotometer, capable of measuring absorbence at 352 NM
Sampling train, refer to Support Equipment description, page 7-
One pair matched 1 CM spectrophotometer cells
Timer or stopwatch, readable to the nearest second

Supplies:

Spectrophotometer operating instructions
Absorbing reagent 65 ml or more
Absorbence to Ozone Concentration conversion curve or table
Air supply flowmeter calibration curve
Sampling train flowmeter calibration curve
External Ozone Generator calibration curve
Distilled water, 2 l
Soft lint-free cloth

Personnel Required:

One Technician

Equipment Conditions:

Ozone Monitor installed. Refer to page 1-1.
Primary Multipoint Calibration performed. Refer to page 8-15.

NOTE

Before performing this task, start up the spectrophotometer following the manufacturer's instructions.

NOTE

The following connections should be made with ground glass connectors. Glass butt-to-butt connections may also be made using tygon tubing.

CAUTION

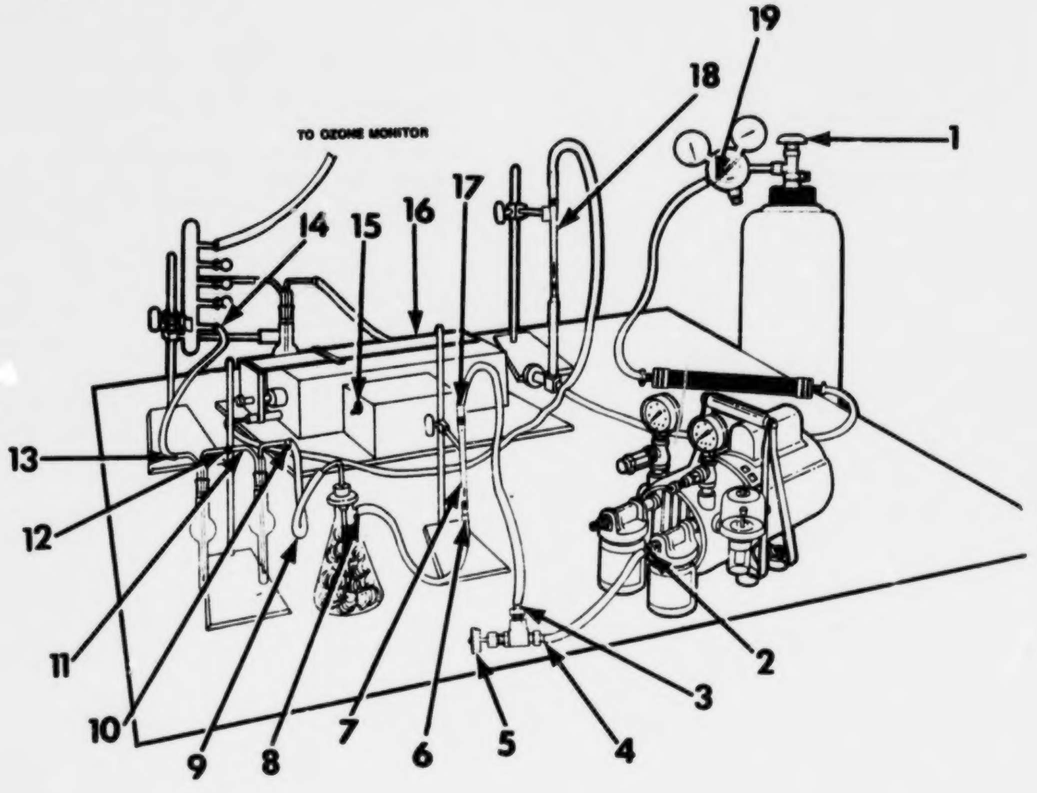
Avoid use of tygon tubing except as connectors.

1. Connect input tube of first absorber (13) to a manifold outlet (14).
2. Connect input tube of second absorber (11) to output tube of first absorber (12).
3. Connect input tube of glass wool trap (9) to output tube of second absorber (10).
4. Connect output tube of glass wool trap (8) to bottom inlet of flowmeter (6).

NOTE

Be sure flowmeter is mounted vertically.

5. Connect top outlet of flowmeter (17) to inlet of needle valve (3).



6. Connect outlet of needle valve (4) to inlet of air pump (2).

CAUTION

Check that all connections are tight before proceeding.

NOTE

An air pump capable of maintaining a 10,000 cc/min flow can be substituted for the air cylinder in the following steps.

7. Turn valve on air cyclinder (1) fully counterclockwise.

8. Adjust air cylinder regulator (19) to obtain an indication of 10,000 cc/min on the air supply flowmeter (18).

NOTE

9. Set External Ozone Generator ON/OFF switch (15) to ON.

10. Set External Ozone Generator scale (16) at 30 mm.

11. Wait 10 minutes before proceeding.

12. Pipette 10 ml of absorbing reagent into each absorber.

NOTE

Do not proceed until spectrophotometer is stabilized and ready to operate.

13. Set vacuum pump ON/OFF switch to ON.

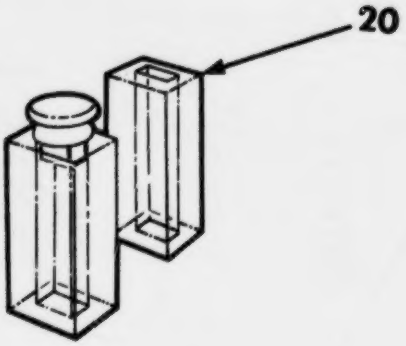
14. Quickly adjust needle valve (5) to get an indication of 1000 cc/min flow rate on the sample train flowmeter (7).

NOTE

Flowmeter cannot be read directly. A calibration curve is required to obtain actual flow rate.

14A. Connect sampling train to the manifold and start timing. After 10 minutes disconnect the sampling trains from the manifold and stop the vacuum pump.

15. Fill a 1 cm spectrophotometer cell (20) from the remaining absorbing reagent.



16. Place the cell in the spectrophotometer and zero the instrument following manufacturer's instructions.

17. Empty the cell, rinse in distilled water, and dry using a soft lint-free cloth.

18. Set air pump ON/OFF switch to OFF after exactly 10 minutes.

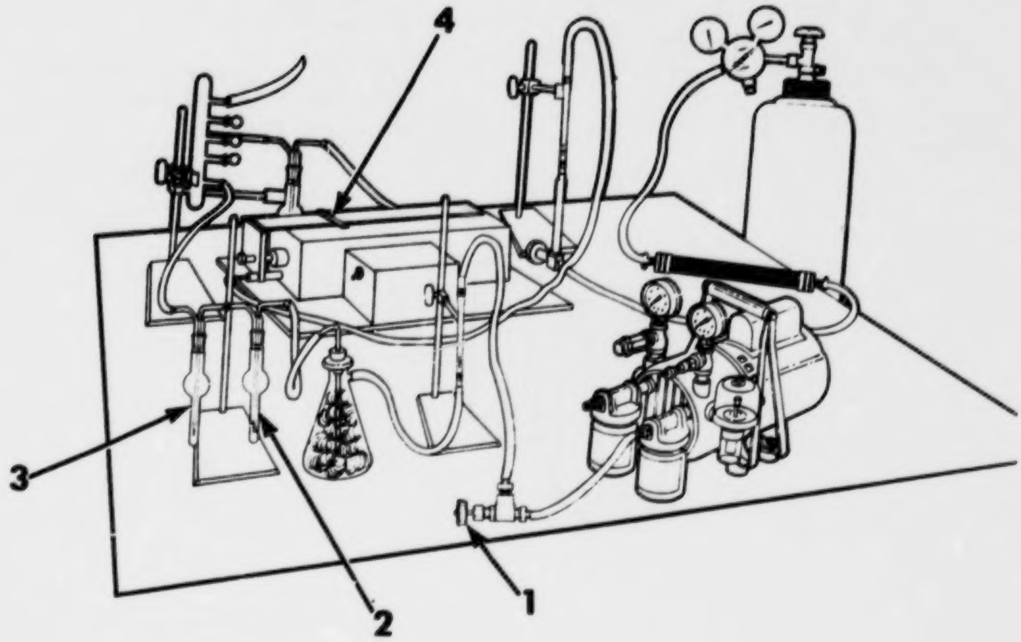
19. Transfer absorbing reagent from absorber (1) into a clean 1 cm spectrophotometer cell (5).

20. Transfer absorbing reagent from absorber (2) into a clean 1 cm spectrophotometer cell (5).

21. Measure the absorbances of each cell using the spectrophotometer according to manufacturer's instructions.

22. Add the two absorbance readings.

23. Record the sum of the two absorbance readings.



24. Empty the cells, rinse in distilled water, and dry using a soft lint-free cloth.

25. Rinse the absorbers in distilled water and shake out excess water.

26. Determine the ozone concentration corresponding to the absorbance sum, using the conversion table or chart supplied.

27. Determine the ozone concentration corresponding to the external ozone generator scale (4) setting, using the external ozone generator calibration curve.

28. Compare the two ozone concentration values. If the sample value differs more than 5% from the ozone generator value repeat steps 12 through 26. 26. If the difference is still more than 5%, report to your supervisor and request a primary calibration.

29. Set the external ozone generator scale (4) to 60 mm.

30. Wait 10 minutes before proceeding.

31. Pipette 10 ml of absorbing reagent into each absorber.

NOTE

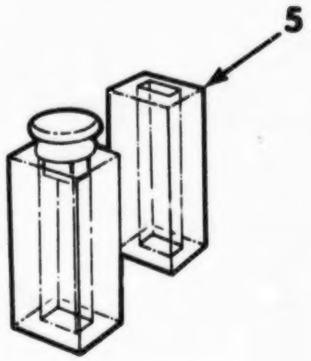
The following steps require exact timing. Start and stop timer and air pump at the same time.

32. Set vacuum pump ON/OFF switch to ON and begin timing.

33. Set vacuum pump ON/OFF switch to OFF after exactly 10 minutes.

34. Transfer absorbing reagent from absorber (3) into a clean 1 cm spectrophotometer cell (5).

35. Transfer absorbing reagent from absorber (2) into a clean 1 cm spectrophotometer cell (5).



36. Measure the absorbances of each cell using the spectrophotometer according to manufacturer's instructions.

37. Add the two absorbance readings

38. Record the sum of the two absorbance readings.

39. Determine the ozone concentration corresponding to the absorbance sum, using the conversion table or chart supplied.

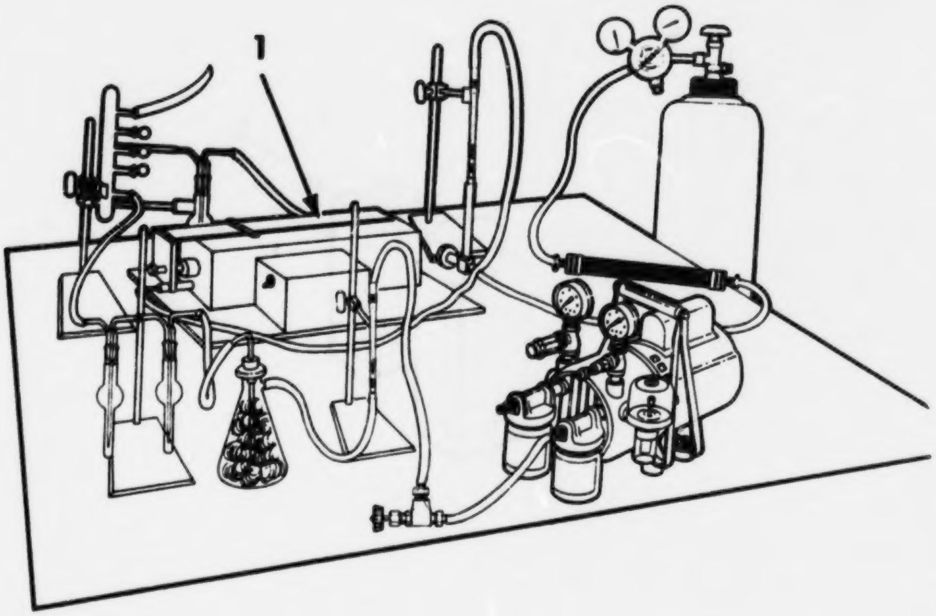
40. Determine the ozone concentration corresponding to the external ozone generator scale (1) setting, using the external ozone generator calibration curve.

41. Compare the two ozone concentration values. If the sample value differs more than 5% from the ozone generator value, repeat steps 30 through 38. If the difference is still more than 5%, report to your supervisor and request a primary calibration.

42. Disassemble sampling train; rinse glassware in distilled water, dry, and store.

43. Shut down spectrophotometer according to manufacturer's instructions.

END OF ACTIVITY



CALIBRATE THE OZONE MONITOR USING THE EXTERNAL OZONE GENERATOR (SECONDARY CALIBRATION)

INPUT CONDITIONS

Introduction

This activity describes the procedure for calibrating the Ozone Monitor using the External Ozone Generator. The procedure also establishes the reference reading of the Internal Ozone Generator for use in making span checks.

Applicable Mods:

All

Special Tools and Test Equipment

One Bubblemeter Kit
One Stopwatch
One Support Stand
One Utility Clamp

Supplies:

Liquid Leak Detector Solution
Calibration Data Log
Flowmeter Calibration Curve
Supplied Data Sheet
External Ozone Generator Calibration Curve
Ozone Monitor Calibration Curve

Equipment Conditions:

Primary Calibration performed, and External Ozone Generator and Ozone Monitor Calibration Curves prepared. If not, refer to page 8-15.
Start Up pertormed. Refer to page 3-1.
Check of the External Ozone Generator performed. Refer to page 4-3.
Ethylene cylinder pressure 50 psi or more.
Air cylinder pressure 100 psi or more.
Strip chart recorder connected to Monitor and adjusted according to manufacturer's instructions.

Personnel Required:

One Technician

1. Rotate ethylene pressure regulating control (2) fully counterclockwise.

2. Rotate air pressure regulating control (5) fully counterclockwise.

3. Rotate ethylene cylinder valve (4) counterclockwise until cylinder gauge (3) indicates pressure.

4. Rotate air cylinder valve (1) counterclockwise until cylinder gauge (6) indicates pressure.

5. Rotate ethylene pressure regulating control (2) clockwise until output gauge indicates 30 psi.

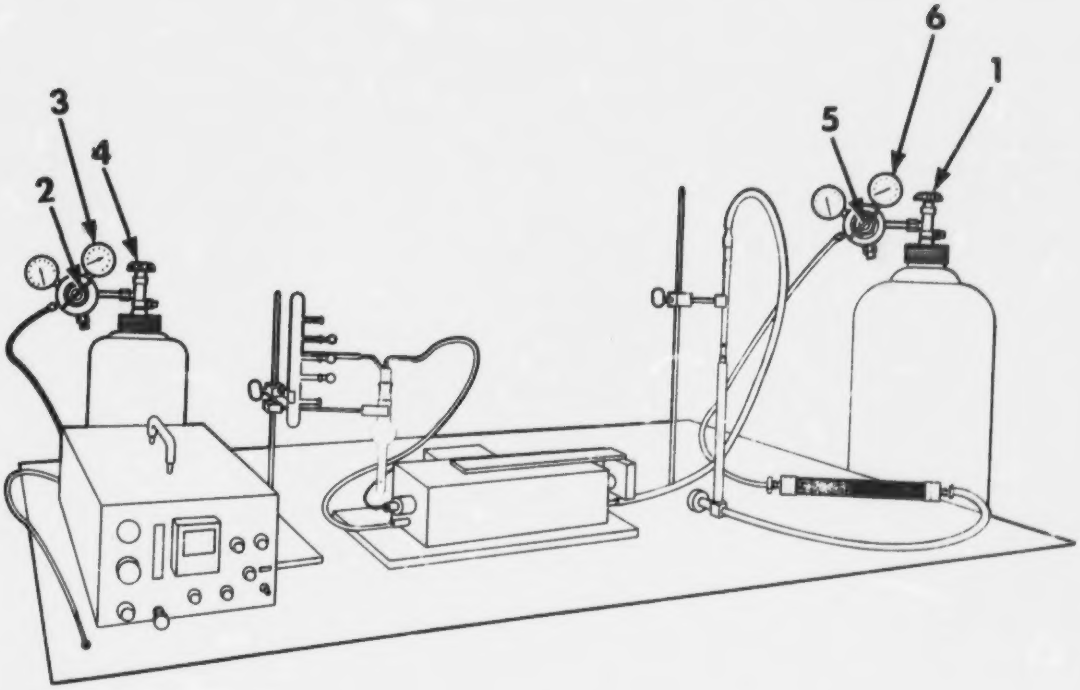
6. Adjust ethylene pressure regulator (9) to pressure specified on Supplied Data Sheet.

NOTE

When calibrating MOD A, adjust regulator on Ethylene Flow Box to pressure specified on Supplied Data Sheet.

NOTE

Before mounting bubblemeter, rinse inside of tube with Liquid Leak Detector or a soapy solution.



Mount bubblemeter (12) in vertical position. Add Liquid Leak Detector until solution level reaches input tube (10).

Connect bubblemeter tubing (13) to diverter valve (7).

NOTE

MOD A diverter valve is located on Ethylene Flow Box.

Pull diverter valve (7) outward.

Momentarily depress rubber bulb (11) on bubblemeter until bubble forms inside tube and start timer when bubble reaches 0 on bubblemeter scale.

After exactly 1 minute, read the height reached by the bubble in ml on the bubblemeter scale.

Depress diverter valve and stop timer.

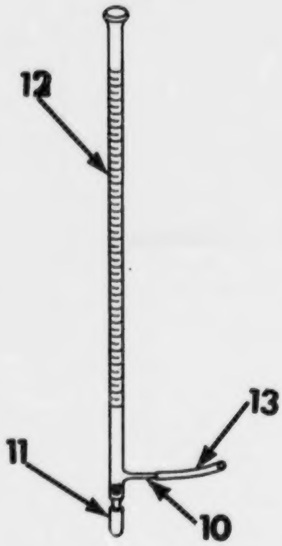
13. Compare the bubblemeter flow rate reading against flow rate specified on the Data Sheet.

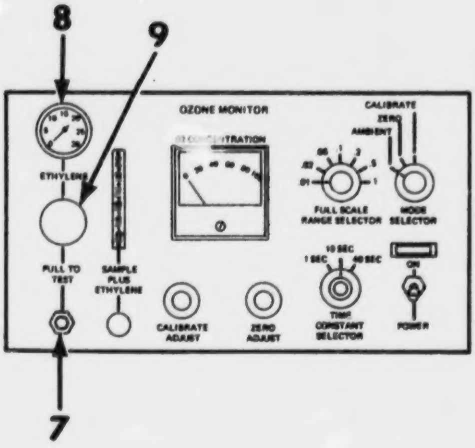
NOTE

If the bubblemeter flow rate is not as specified, increase or decrease ethylene pressure as required using the ethylene pressure regulation control (9). Repeat steps 9 through 13 until measured flow is as specified on the Data Sheet.

14. Record ethylene pressure (8) on the Calibration Data Log.

15. Disconnect bubblemeter (12) from diverter valve (7). Clean and store bubblemeter.




8
9
7
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE
ZERO
AMBIENT
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER

16. Connect SAMPLE INLET tubing (3) to manifold (4).

NOTE

If SAMPLE INLET is connected to a selector valve, set valve to permit flow from the External Ozone Generator System.

17. Rotate air regulating control clockwise (1) until output pressure gauge (6) indicates 15 psi.

NOTE

If a laboratory air pump is used for calibration, set pump power switch to on.

18. Rotate needle valve control (2) until flowmeter (5) indicates 10,000 cc/min flow rate.

19. Adjust SAMPLE PLUS ETHYLENE flowmeter (9) to value specified on Supplied Data Sheet.

NOTE

Flow rate cannot be read directly from flowmeter. A flowmeter calibration data sheet is necessary to determine correct flowmeter setting.

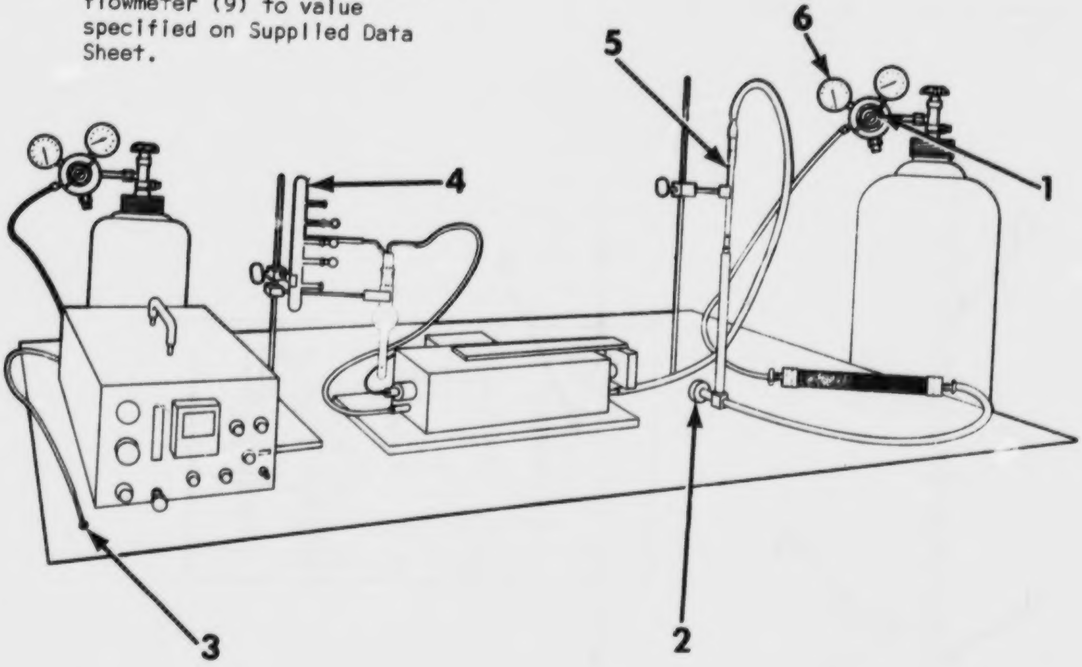
20. Set Ozone Generator sleeve (13) to 0.

21. Set FULL SCALE RANGE SELECTOR switch (11) to .01.

22. Wait 10 minutes before proceeding.

23. Unlock ZERO ADJUST control (7). Adjust ZERO ADJUST control until 03 CONCENTRATION meter (10) indicates 0. Lock ZERO ADJUST control (7).

24. Record ZERO ADJUST setting on Calibration Data Log.



25. Check that the chart recorder trace is 5% of the chart width above the chart zero or baseline. If not, adjust chart recorder according to manufacturer's instructions.

26. Set FULL SCALE RANGE SELECTOR swith (11) to .5.

27. Set External Ozone Generator switch (12) to ON. Allow generator 15 minutes to stabilize.

NOTE

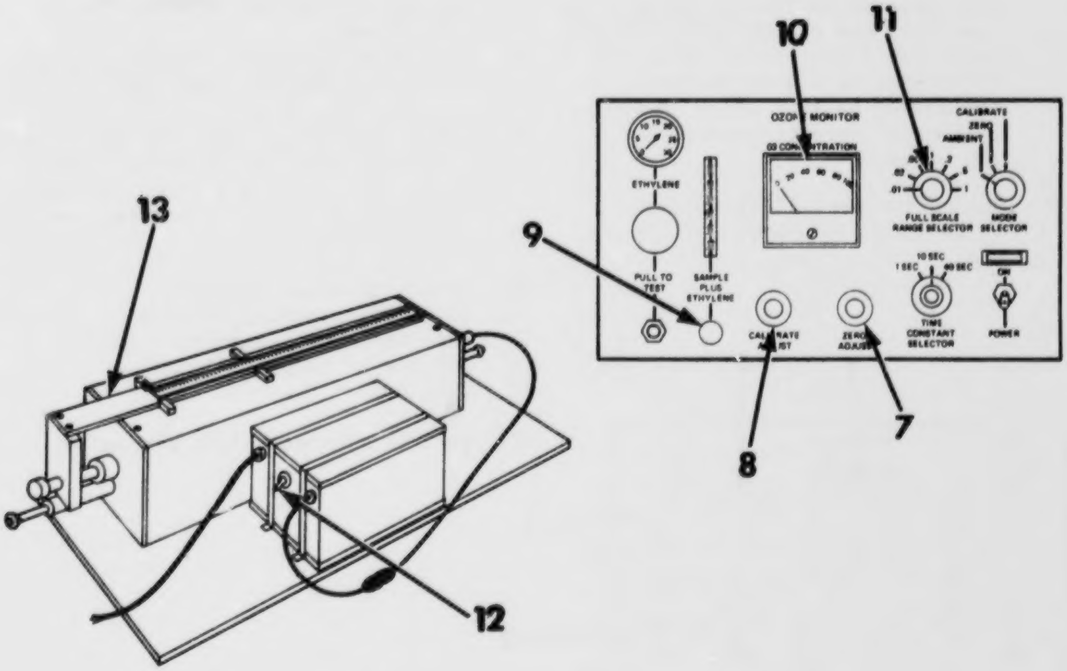
The External Ozone Generator Calibration Curve is necessary to complete calibration of the Ozone Monitor.

28. Using the ozone generator calibration curve, set the external ozone generator sleeve (13) for an output of exactly 0.4 ppm.

29. Wait 10 minutes before proceeding.

30. Unlock CALIBRATE ADJUST control (8). Adjust CALIBRATE ADJUST control until 03 CONCENTRATION meter (10) indicates exactly 0.4 ppm. Lock CALIBRATE ADJUST control (8).

31. Record External Ozone Generator sleeve setting, ozone concentration from Ozone Generator Calibration Curve, and 03 CONCENTRATION meter indication on Calibration Data Log.


10
11
OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
13
9
PULL TO TEST
SAMPLE PLUS ETHYLENE
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
8
7
12

32. Record CALIBRATE ADJUST setting on Calibration Data Log.

33. Check that strip chart recorder indicates exactly 85% of full chart deflection. If not, check out the recorder according to manufacturer's instructions.

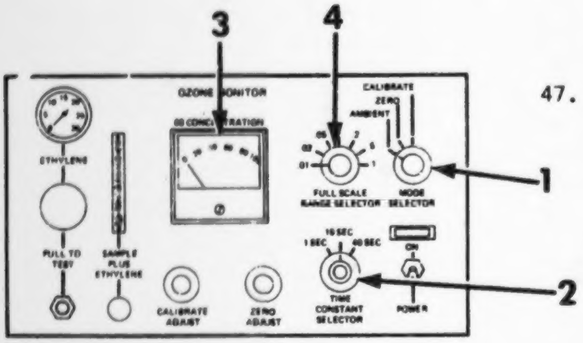
34. Using the ozone generator calibration curve, set the external ozone generator sleeve (5) for an output of exactly 0.2 ppm.

35. Wait 10 minutes before proceeding.

36. Record External Ozone Generator sleeve setting, ozone concentration from Ozone Generator Calibration Curve, and 03 CONCENTRATION meter indication on Calibration Data Log.

37. **Determine the difference between the ozone concentration value read from the 03 CONCENTRATION meter and 0.2. Divide this difference by 0.2 and multiply the answer by 100. This is the percent difference between the two values.**

38. Record the percent difference value in the Calibration Data Log.


3
4
1
2
OZONE MONITOR
03 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
.01
.02
.05
.2
.5
1
FULL SCALE RANGE SELECTOR
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER

39. Check that strip chart recorder indicates exactly 45% of full chart deflection. If not, check out the recorder according to manufacturer's instructions.

40. Using the ozone generator calibration curve, set the external ozone generator sleeve (5) for an output of exactly 0.1 ppm.

41. Wait 10 minutes before proceeding.

42. Record External Ozone Generator sleeve setting, ozone concentration from Ozone Generator Calibration Curve, and 03 CONCENTRATION meter indication on Calibration Data Log.

43. **Determine the difference between the ozone concentration value read from the 03 CONCENTRATION meter and 0.1. Divide this difference by 0.1 and multiply the answer by 100. This is the percent difference between the two values.**

44. Record the percent difference value in the Calibration Data Log.

45. Check that strip chart recorder indicates exactly 25% of full chart deflection. If not, check out the recorder according to manufacturer's instructions.

46. Using the ozone generator calibration curve, set the external ozone generator sleeve (5) for an output of exactly 0.05 ppm.

47. Wait 10 minutes before proceeding.

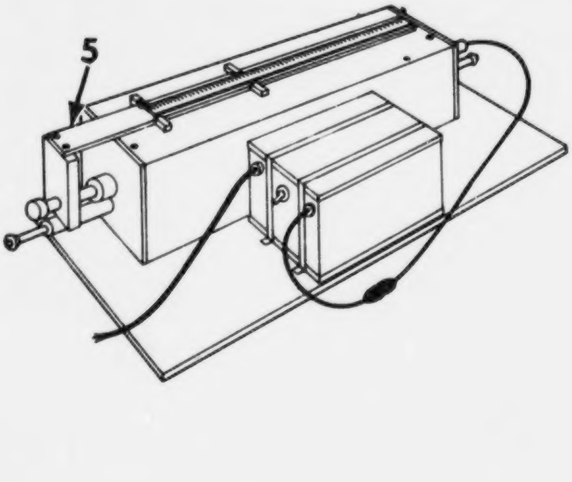
48. Record External Ozone Generator sleeve setting, ozone concentration from Ozone Generator Calibration Curve, and 03 CONCENTRATION meter indication on Calibration Data Log.

49. Determine the difference between the ozone concentration value read from the 03 CONCENTRATION meter and 0.05. Divide the difference by 0.05 and multiply the answer by 100. This is the percent difference between the two values.

50. Record the percent difference value in the Calibration Data Log.

51. Check that strip chart recorder indicates exactly 15% of full chart deflection. If not, check out the recorder according to manufacturer's instructions.

52. Check that all percent difference values are less than 14%.



NOTE

If any percent difference value is not within tolerance, reset the external ozone generator to the proper ozone output and repeat the check. If the percent difference value is still out of tolerance, refer to Troubleshoot the Ozone Monitor, page 6-2.

53. Check that all calibration data has been recorded on Calibration Data Log.

54. Set MODE SELECTOR switch (1) to CALIBRATE.

55. Set FULL SCALE RANGE SELECTOR switch (4) to .5.

56. Set TIME CONSTANT SELECTOR switch (2) to 10 SEC.

57. Wait 15 minutes for monitor to stabilize.

58. Check that 03 CONCENTRATION meter (3) indicates between 30% and 38% of meter scale. If not, go to adjust the Internal Ozone Generator, page 7-27.

59. Record 03 CONCENTRATION meter indication on Calibration Data Log.

NOTE

The value recorded in this step is the New Span Check Value to be used when performing the check the Ozone Monitor Zero and Span Values task, page 4-1.

END OF ACTIVITY

INSPECT AND SERVICE CALIBRATION SAMPLE FILTER

INPUT CONDITIONS

Introduction

The activated charcoal/silica gel Calibration Sample Filter should be inspected monthly and serviced as necessary, using the following procedure.

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

Calibration Sample Filter

Personnel Required:

One Technician

Equipment Conditions:

Ozone Monitor installed and operating.

NOTE

Calibration Sample Filter should be replaced when silica gel turns pink.

NOTE

Calibration Sample Filter life normally is three months. Filter life may vary according to local conditions.

NOTE

Some MOD A Monitors utilize three filter elements. When silica gel turns pink, replace all three filter elements.

NOTE

After removal, the Calibration SAMPLE filter should be cleaned and repacked by a qualified chemical technician. The filter may then be reused.

1. Check that silica gel (1) in Calibration Sample Filter (2) is pink. If not, filter does not require servicing. Stop here.

NOTE

Calibration Sample Filter is replaced when silica gel turns pink.

2. Set POWER switch (3) to off.

CAUTION

If monitor must be moved to gain access to filter, avoid unnecessary strain on tubing and connections.

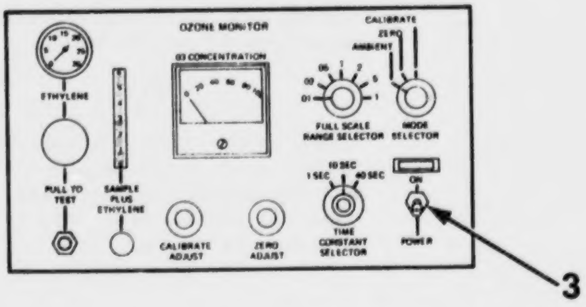
3. Disconnect tubing (4) from bottom of filter (5).

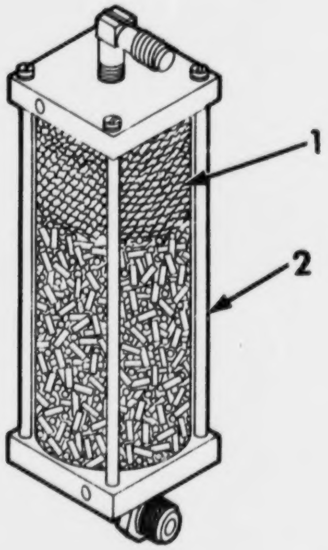
4. Remove two screws (6).

NOTE

Some MOD A monitors utilize 3 filter elements. When silica gel turns pink, replace all 3 filter elements.

5. Remove filter (7).


OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
3



6. Install new filter (2).

7. Reinstall two screws (6).

8. Reconnect tubing (4) to bottom of filter (5).

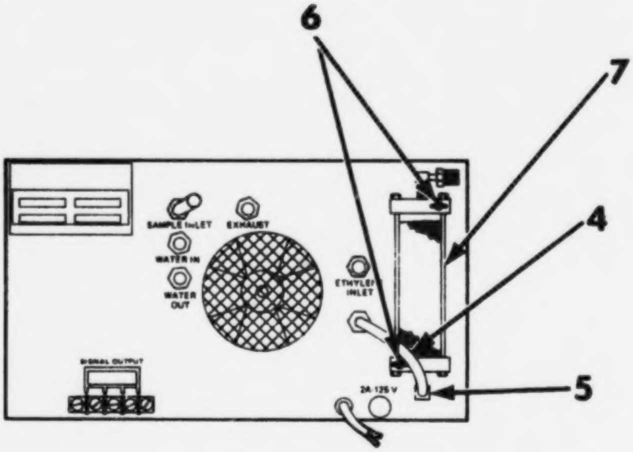
NOTE

If monitor was moved to change filter, carefully reposition monitor at this time.

9. Set POWER switch (3) to ON.

10. Check output of Internal Ozone Generator. Refer to Check the Ozone Monitor Zero and Span Values, page 4-1.

END OF ACTIVITY


6
7
4
5
SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
2A 125 V

INSPECT AND SERVICE THE SAMPLE FILTER

INPUT CONDITIONS

Introduction

The 5 micron teflon Sample Filter should be inspected every two weeks and replaced as necessary, using the procedure described in this section.

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

Teflon Filter Elements, 5 micron, 47 mm diameter

Personnel Required:

One Technician

Equipment Conditions:

Ozone Monitor installed and operating.

CAUTION

To avoid damage to fittings in Monitor, teflon fittings should be tightened finger tight.

NOTE

Sample Air Filter element life normally is two weeks. Filter life may vary according to local conditions.

Preceding page blank

1. Set POWER switch (1) to OFF.

NOTE

Some MOD A monitors have sample filter located inside the chassis. To service filter, remove four screws and top cover.

2. Disconnect inlet tubing (2) from filter IN fitting (4).

3. Disconnect outlet tubing (2) from filter outlet (5).

4. Loosen wing-nuts (3) and remove frame (6).

5. Pull filter assembly (9) apart.

6. Remove filter element (8).

NOTE

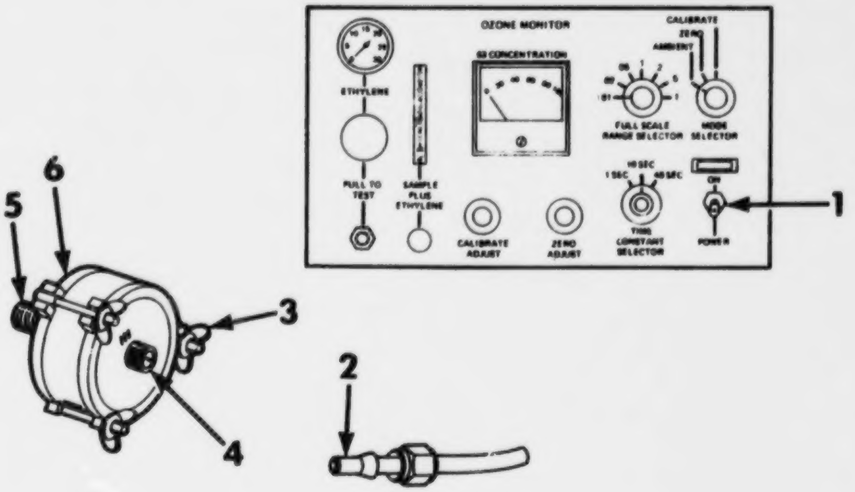
Filter element life normally is two weeks. Filter life may vary according to local conditions. Replace elements as required.

7. Install filter element (8).

8. Reassemble filter assembly (9).

9. Install frame (10) on filter assembly (9).

10. Tighten wing-nuts (7).


OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
FULL SCALE RANGE SELECTOR
MODE SELECTOR
CALIBRATE
ZERO
AMBIENT
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
1
2
3
4
5
6

11. Connect output side of filter (5) to outlet tubing (2).

NOTE

Output side of sample filter is not marked.

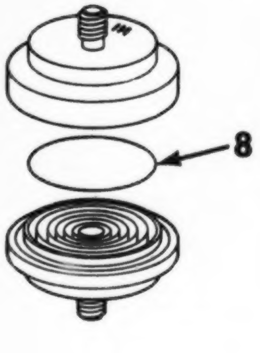
12. Connect sample inlet tubing (2) to filter IN fitting (4).

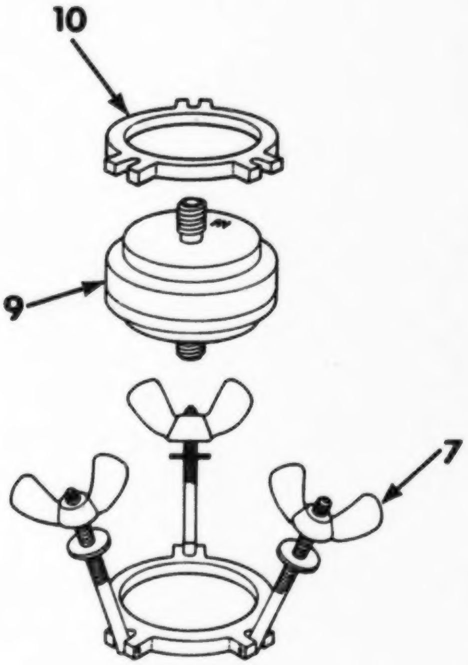
13. If servicing MOD A monitor, reinstall top cover and secure with screws.

14. Set POWER switch (1) to ON.

15. Recheck calibration. Refer to Check the Ozone Monitor Zero and Span Values, page 4-1.

END OF ACTIVITY





DIRECTIONS FOR TROUBLESHOOTING

The Checkout and Troubleshooting procedures for the Ozone Monitor are combined into a single step-by-step sequence, beginning on the next page. The sequence is basically a series of tests which systematically locate the faulty part(s). In order to be sure that you have located everything that might be wrong, always start at Step 1 of sequence and perform the steps in order.

Each test you make helps narrow the list of things that might be causing the malfunction and determines what will be the next step in the sequence.

It's important to remember that:

1. If a step does not require a test or decision, perform the step and then go on to the next step.

2. If a step requires a test or decision whose outcome is either good or bad, the correct next step naturally depends on the outcome. Consider the statement, "Check that POWER light is lit. If not, go to Step 6."

   (a) If the test outcome is good (in the example, if the POWER light is lit), go on to the next step.

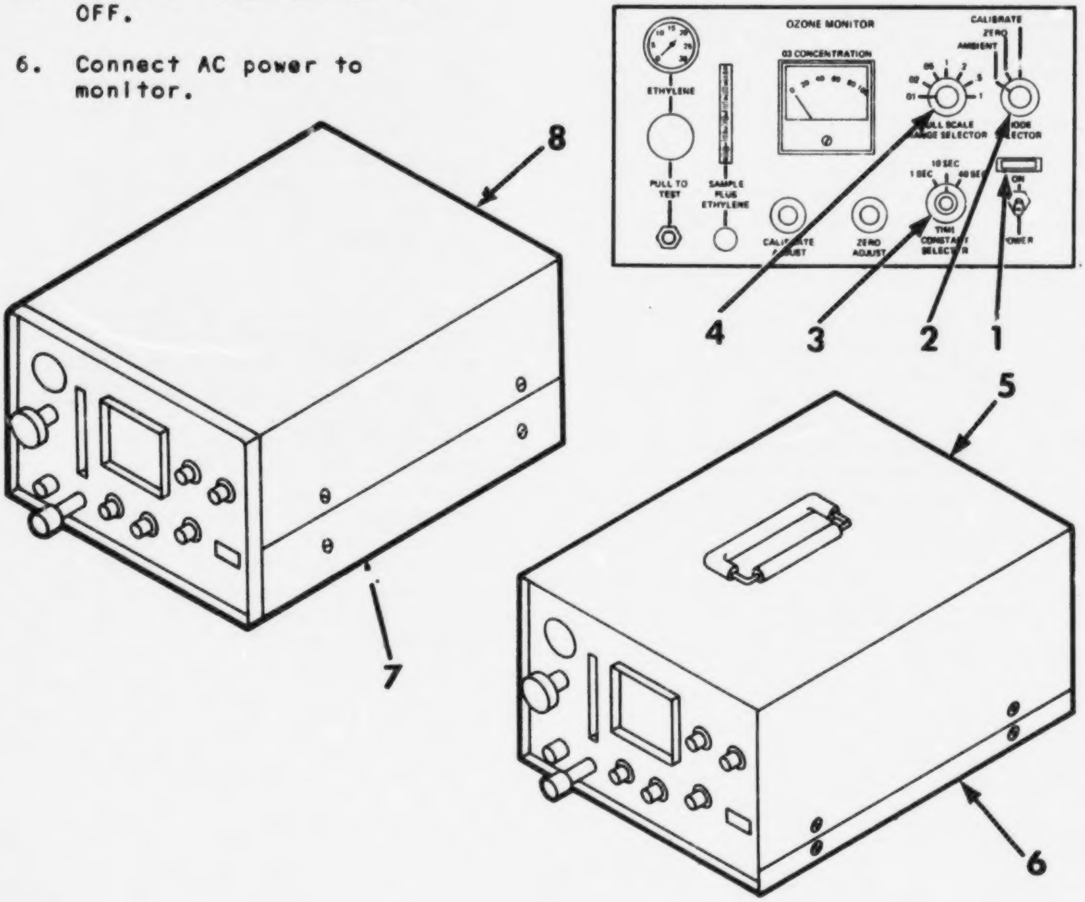
   (b) If the test outcome is bad, the correct next step is given as a reference. In the example, if the light was not lit, you would be expected to skip to Step 6.

Cross-referencing is accomplished using both step and page numbers. References to other steps in the Troubleshooting Section use only step number, e.g., Step 6. References to other sections of the book use section number and page number; "Go to 3-12" means Section 3, Page 12.

When you encounter a step requiring you to replace a part, perform the replacement, and then go to the next step in the Troubleshooting sequence. You will eventually be directed "Go to Step 1." This means that the trouble has been found and corrected and now you must check to be sure the monitor is operating properly. The troubleshooting job is not finished until the procedure leads you to the statement that reads "END OF CHECKOUT."

TROUBLESHOOT THE OZONE MONITOR

1. Disconnect AC power from monitor.
2. If you are servicing a MOD-C monitor, go to step 4. If not, go to next step.
3. Remove top and bottom covers (5) and (6) from monitor. Go to step 5.
4. Remove top cover (8) and remove monitor chassis from bottom cover (7).
5. Set the POWER switch to OFF.
6. Connect AC power to monitor.
7. Check that POWER indicator (1) is not lit. If lit, go to step 127.
8. Set MODE SELECTOR (2) to AMBIENT.
9. Set FULL SCALE RANGE SELECTOR (4) to 1.
10. Set TIME CONSTANT SELECTOR (3) to 10 SEC.
11. Set the POWER switch to ON.


OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
1 SEC
10 SEC
60 SEC
TIME CONSTANT SELECTOR
ON
POWER
4
3
2
1
8
7
5
6

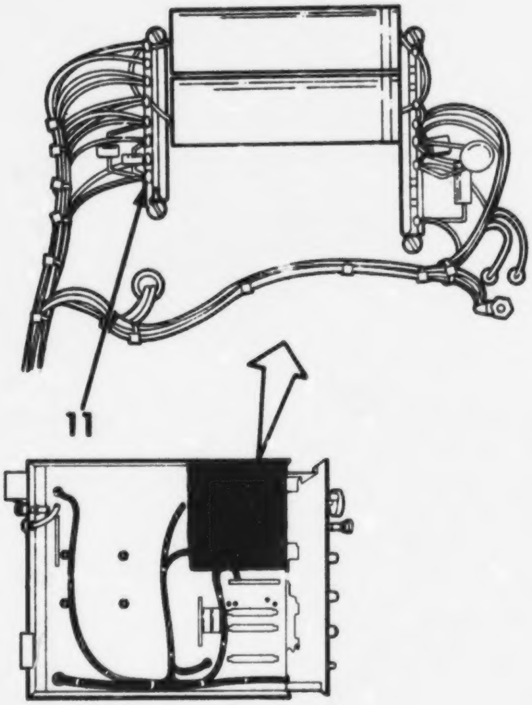
12. Check that POWER indicator (1) is lit. If not, go to step 134.

13. Check that fan (9) or (10) is rotating. If not, go to step 1059.

14. Set the POWER switch to OFF.

15. Disconnect AC power from monitor.

16. Position monitor chassis on right side.

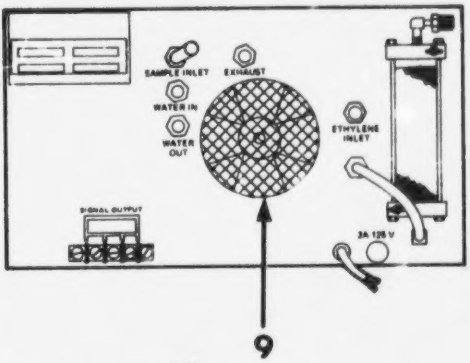


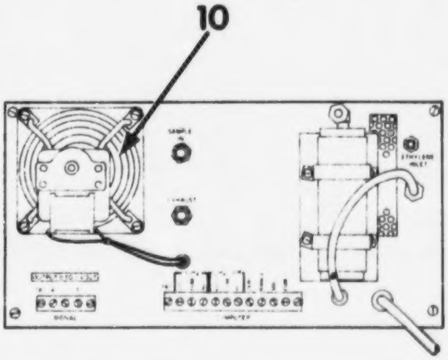
NOTE

For the checks performed in step 17 through step 25, AC power must have been disconnected from monitor for a minimum of 15 minutes. Also monitor and ambient air must be at a temperature between 75 and 80 degrees.

17. If you are servicing a MOD-C monitor, go to step 20. If not, go to next step.

18. Use VOM to measure VDC. Connect positive test lead to terminal (11), common test lead to chassis ground.


SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
3A 125V
9



19. Go to step 21.

20. Use VOM to measure VDC. Connect positive test lead to terminal (2), common test lead to chassis ground.

21. Connect AC power to monitor.

NOTE

The next 4 steps require timing, begin timing when POWER switch is set to ON.

22. While observing VOM, set the POWER swith to ON and check that VOM initially indicates between 2.0 and 4.0 VDC. If not, go to step 433.

23. Check that VOM indication begins an abrubt decrease in 1.5 to 3.5 minutes. If not, go to step 585.

24. Check that VOM indication stabilizes within 15 minutes. If not, go to step 638.

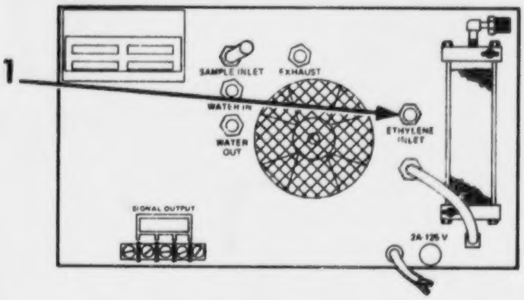
25. Check that VOM indicates between .75 and 1.5 VDC. If not, go to step 655.

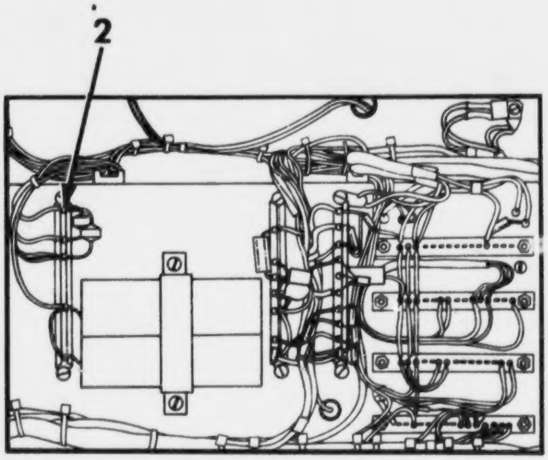
26. Set the POWER switch to OFF.

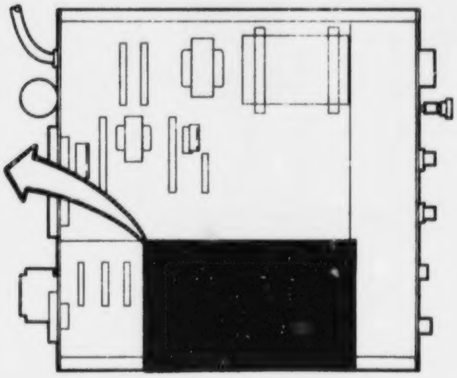
27. Disconnect AC power from monitor.

28. Position monitor chassis in normal operating position.

29. Connect Ethylene supply line to ETHYLENE INLET (1) or (4).







30. Connect AC power to monitor.

31. Set the POWER switch to ON.

NOTE

Calibration apparatus must be properly configured to continue with checkout. Perform Install the Ozone Monitor beginning with step 23 and continuing through step 35. When calibration train is properly configured, go on to following note.

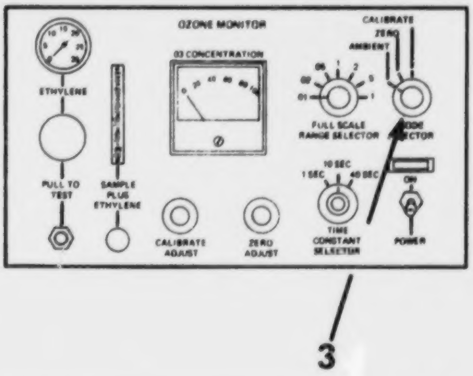
Calibration step failed	Refer to step
6	672
11	786
13	1078
19	1123

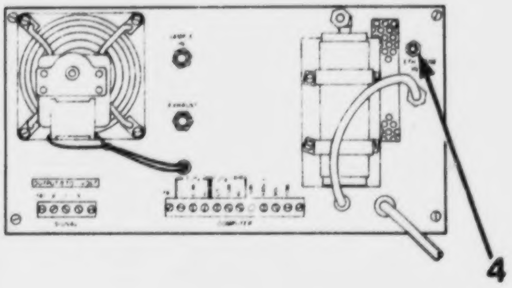
5

NOTE

To properly adjust equipment for continuation of checkout, perform Calibrate the Ozone Monitor using the EXTERNAL O3 GENERATOR, beginning with step 1 and continuing through step 19. When completed, go on to step 32. If any step in calibrate procedure cannot be successfully performed, record that step number and refer to table (5) for reference to appropriate troubleshooting procedure.

32. Set MODE SELECTOR (3) to ZERO.


OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
FULL SCALE RANGE SELECTOR
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
3



33. If you are servicing a MOD-A or B monitor, go to step 36. If not, go to next step.

34. Check that ZERO indicator (4) is lit. If not, go to step 795.

35. Check that CALIBRATE indicator (1) is not lit. If lit, go to step 812.

36. Using "O3 ANALYZER DAILY CHECK SHEET," determine last known ZERO setting and set ZERO ADJUST micrometer (5) or (3) to that setting.

37. Check that O3 CONCENTRATION meter (7) indicates 0 within 1 minute. If not, go to step 1338.

38. Set FULL SCALE RANGE SELECTOR (8) to .5.

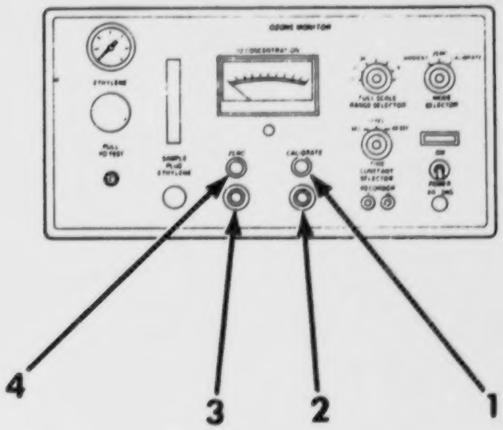
39. Check that O3 CONCENTRATION meter (7) indicates 0 within 30 seconds. If not, go to step 1834.

40. Set FULL SCALE RANGE SELECTOR (8) to .2.

41. Check that O3 CONCENTRATION meter (7) indicates 0 within 30 seconds. If not, go to step 1840.

42. Set FULL SCALE RANGE SELECTOR (8) to .1.

43. Check that O3 CONCENTRATION meter (7) indicates 0 plus or minus 1 percent within 30 seconds. If not, go to step 1842.


OZONE MONITOR
ETHYLENE
ZERO
CALIBRATE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
TIME CONSTANT SELECTOR
RECORDER
POWER
4
3
2
1

44. Set FULL SCALE RANGE SELECTOR (8) to .05.

45. Check that 03 CONCENTRATION meter (7) indicates 0 plus or minus 2 percent within 30 seconds. If not, go to step 1844.

46. Set FULL SCALE RANGE SELECTOR (8) to .02.

47. Check that 03 CONCENTRATION meter (7) indicates 0 plus or minus 5 percent within 30 seconds. If not, go to step 1846.

48. Set FULL SCALE RANGE SELECTOR (8) to .01.

49. Check that 03 CONCENTRATION meter (7) indicates 0 plus or minus 10 percent within 30 seconds. If not, go to step 1848.

50. Set FULL SCALE RANGE SELECTOR (8) to 1.

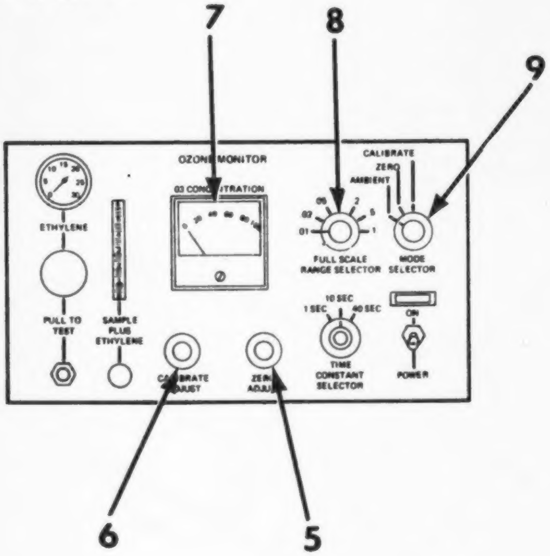
51. Set MODE SELECTOR (9) to AMBIENT.

52. If you are servicing a MOD-A or B monitor, go to step 55. If not, go to next step.

53. Check that ZERO indicator (4) is not lit. If lit, go to step 1035.

54. Check that CALIBRATE indicator (1) is not lit. If lit, go to step 1047.

55. Using "03 ANALYZER DAILY CHECK SHEET," determine last known CALIBRATE setting and set CALIBRATE ADJUST micrometer (6) or (2) to that setting.


7
8
9
OZONE MONITOR
03 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
6
5

NOTE

The External 03 generator scale is graduated both in millimeters and centimeters. When setting the sleeve use the smaller millimeter graduations.

56. If you are servicing a MOD-A or B monitor, go to step 79. If not, go to next step.

57. Using EXTERNAL 03 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM 03 concentration. Set generator sleeve (1) to this setting.

NOTE

When reading 03 concentration meter on MOD-C monitor, use top scale.

58. When 03 CONCENTRATION meter (2) indication stabilizes, check that meter indicates between .07 and .09. If not, go to step 2371.

59. Set FULL SCALE RANGE SELECTOR (3) to .5.

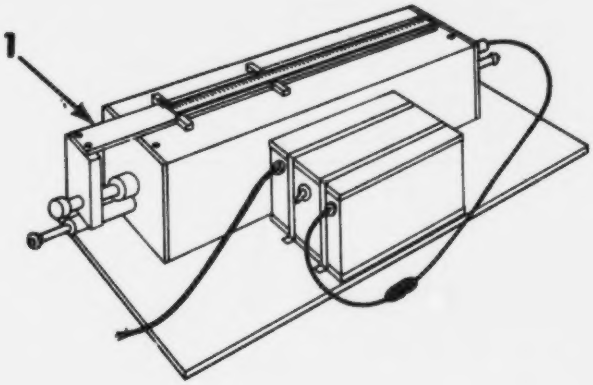
60. When 03 CONCENTRATION meter (2) indication stabilizes, check that meter indicates between .14 and .18. If not, go to step 1888.

61. Set FULL SCALE RANGE SELECTOR (3) to .2.

62. When 03 CONCENTRATION meter (2) indication stabilizes, check that meter indicates between .35 and .45. If not, go to step 1945.

63. Set FULL SCALE RANGE SELECTOR (3) to .1.

64. When 03 CONCENTRATION meter (2) indication stabilizes, check that meter indicates between .7 and .9. If not, go to step 2006.



65. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .008 PPM O3 concentration. Set generator sleeve (1) to this setting.

66. Set FULL SCALE RANGE SELECTOR (3) to .05.

67. When O3 CONCENTRATION meter (2) indication stabilizes, check that meter indicates between .14 and .18. If not, go to step 2073.

68. Set FULL SCALE RANGE SELECTOR (3) to .02.

69. When O3 CONCENTRATION meter (2) indication stabilizes, check that meter indicates between .35 and .45. If not, go to step 2146.

70. Set FULL SCALE RANGE SELECTOR (3) to .01.

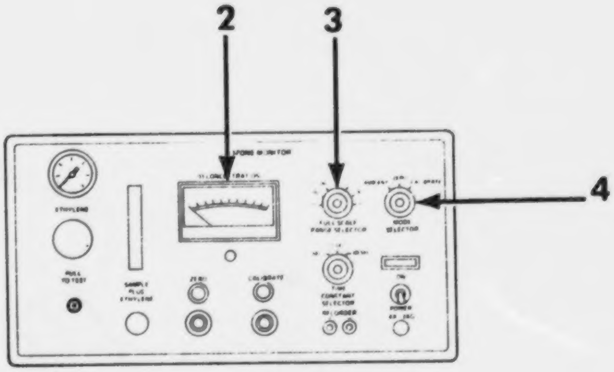
71. When O3 CONCENTRATION meter (2) indication stabilizes, check that meter indicates between .7 and .9. If not, go to step 2223.

72. Set FULL SCALE RANGE SELECTOR (3) to .02.

NOTE

The next step requires timing the rate of fall of meter needle. Begin timing when MODE SELECTOR is set to ZERO, and stop timing when needle falls below .2.

73. Set MODE SELECTOR (4) to ZERO and check that O3 CONCENTRATION meter needle falls below .2 within 7 to 13 seconds. If not, go to step 821.


2
3
4
OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
ZERO
CALIBRATE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
TIME CONSTANT SELECTOR
RECORDER
ON
POWER

74. Set TIME CONSTANT SELECTOR (3) to 1 SEC.

NOTE

The next step requires timing the rate of rise of meter needle. Begin timing when MODE SELECTOR is set to AMBIENT, and stop timing when needle rises above .3.

75. Set MODE SELECTOR (2) to AMBIENT and check that O3 CONCENTRATION meter needle rises above .3 within 3 to 7 seconds. If not, go to step 894.

76. Set TIME CONSTANT SELECTOR (3) to 40 SEC.

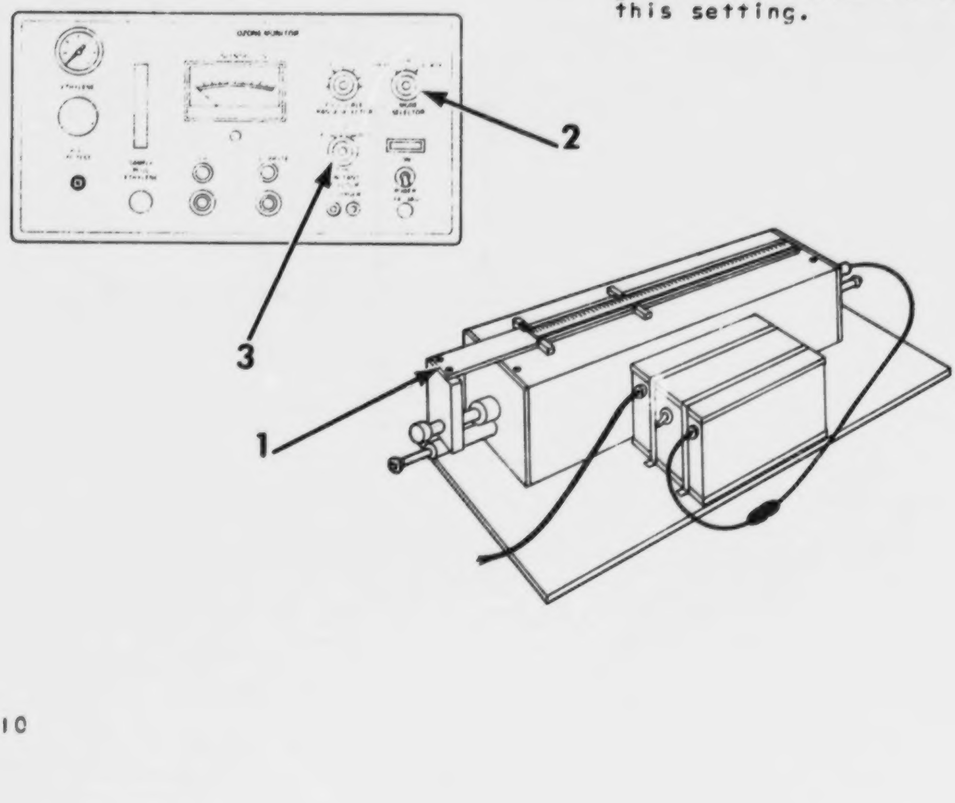
NOTE

The next step requires timing the rate of fall of meter needle. Begin timing when MODE SELECTOR is set to ZERO, and stop timing when needle falls below .2.

77. Set MODE SELECTOR (2) to ZERO and check that O3 CONCENTRATION meter needle falls below .2 within 25 to 45 seconds. If not, go to step 908.

78. Go to step 100.

79. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (1) to this setting.



80. When O3 CONCENTRATION meter (4) indication stabilizes, check that meter indicates between 7 and 9. If not, go to step 2264.

81. Set FULL SCALE RANGE SELECTOR (5) to .5.

82. When O3 CONCENTRATION meter (4) indication stabilizes, check that meter indicates between 14 and 18. If not, go to step 1862.

83. Set FULL SCALE RANGE SELECTOR (5) to .2.

84. When O3 CONCENTRATION meter (4) indication stabilizes, check that meter indicates between 35 and 45. If not, go to step 1917.

85. Set FULL SCALE RANGE SELECTOR (5) to .1.

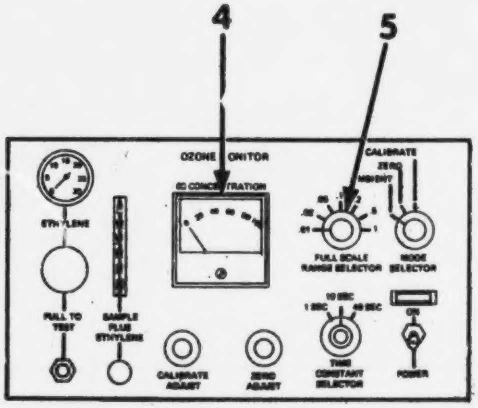
86. When O3 CONCENTRATION meter (4) indication stabilizes, check that meter indicates between 70 and 90. If not, go to step 1976.

87. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .008 PPM O3 concentration. Set generator sleeve (1) to this setting.

88. Set FULL SCALE RANGE SELECTOR (5) to .05.

89. When O3 CONCENTRATION meter (4) indication stabilizes, check that meter indicates between 14 and 18. If not, go to step 2039.

90. Set FULL SCALE RANGE SELECTOR (5) to .02.


4
5
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE
ZERO
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER

91. When O3 CONCENTRATION meter (3) indication stabilizes, check that meter indicates between 35 and 45. If not, go to step 2110.

92. Set FULL SCALE RANGE SELECTOR (4) to .01.

93. When O3 CONCENTRATION meter (3) indication stabilizes, check that meter indicates between 70 and 90. If not, go to step 2185.

94. Set FULL SCALE RANGE SELECTOR (4) to .02.

NOTE

The next step requires timing the rate of fall of meter needle. Begin timing when MODE SELECTOR is set to ZERO, and stop timing when needle falls below 20.

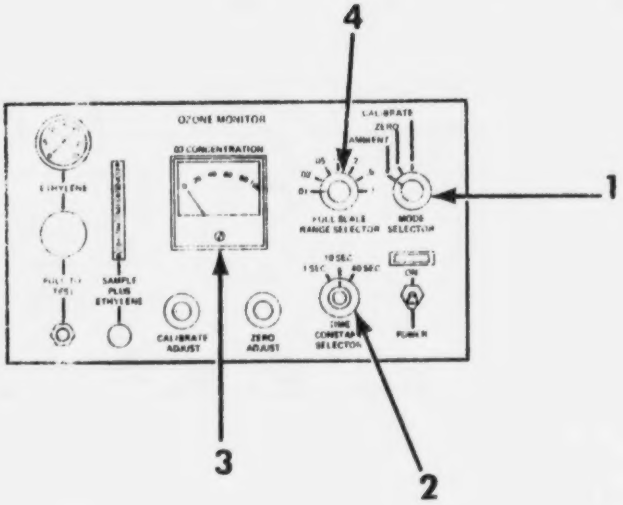
95. Set MODE SELECTOR (1) to ZERO and check that O3 CONCENTRATION meter needle falls below 2 within 10 to 15 seconds. If not, go to step 821.

96. Set TIME CONSTANT SELECTOR (2) to 1 SEC.

NOTE

The next step requires timing the rate of rise of meter needle. Begin timing when MODE SELECTOR is set to AMBIENT, and stop timing when needle rises above 30.

97. Set MODE SELECTOR (1) to AMBIENT and check that O3 CONCENTRATION meter needle rises above 30 within 2 to 5 seconds. If not, go to step 894.


4
1
3
2
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
SAMPLE PLUS ETHYLENE
CALIBRATE
ZERO
AMBIENT
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER

98. Set TIME CONSTANT SELECTOR (2) to 40 SEC.

NOTE

The next step requires timing the rate of fall of meter needle. Begin timing when MODE SELECTOR is set to ZERO, and stop timing when needle falls below 20.

99. Set MODE SELECTOR (1) to ZERO and check that 03 CONCENTRATION meter needle falls below 20 within 30 to 50 seconds. If not, go to step 908.

100. Set TIME CONSTANT SELECTOR (2) to 10 SEC.

101. Set FULL SCALE RANGE SELECTOR (4) to 1.

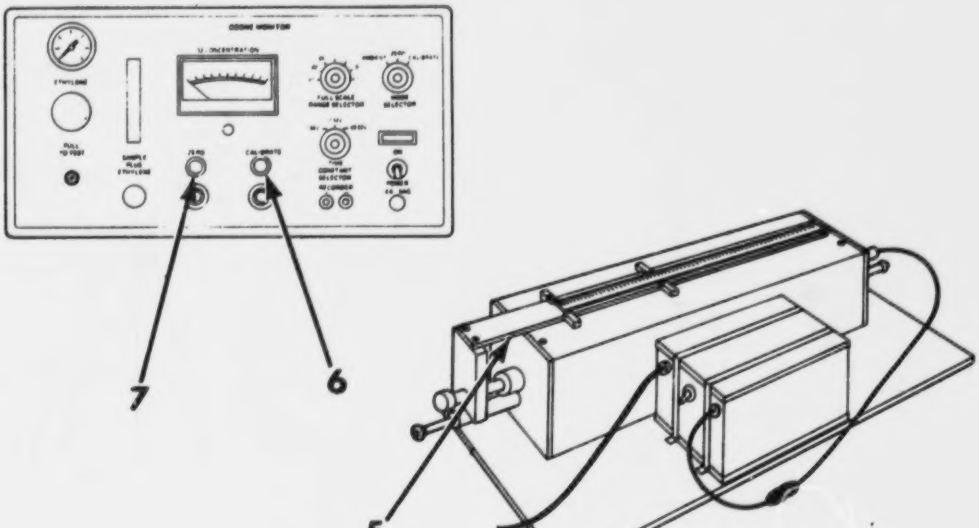
102. Using EXTERNAL 03 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM 03 concentration. Set generator sleeve (5) to this setting.

103. Set MODE SELECTOR (1) to CALIBRATE.

104. If you are servicing a MOD-A or B monitor, go to step 107. If not, go to next step.

105. Check that CALIBRATE indicator (6) is lit. If not, go to step 915.

106. Check that ZERO indicator (7) is not lit. If lit, go to step 932.



107. Using "O3 ANALYZER DAILY CHECK SHEET," determine and record last known internal O3 generator SPAN reading. Set FULL SCALE RANGE SELECTOR to proper scale to make this reading.

108. Check that O3 CONCENTRATION meter indicates within 5 divisions of reading detemined in step 107. If not, go to step 1214.

109. If you are servicing a MOD-A or B monitor, go to step 116. If not, go to next step.

110. Check that strip chart recorder indication corresponds to O3 CONCENTRATION meter indication. If not, go to step 1305.

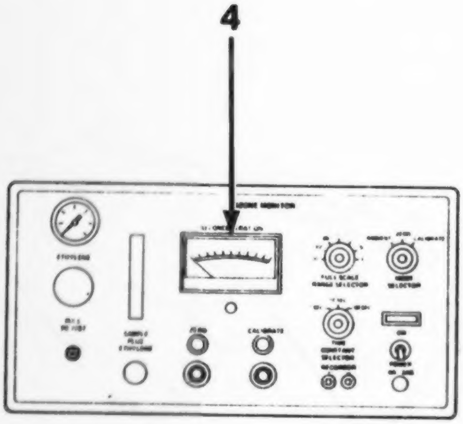
111. Connect a jumper wire between TB2 ZERO (3) and TB2 COM (1).

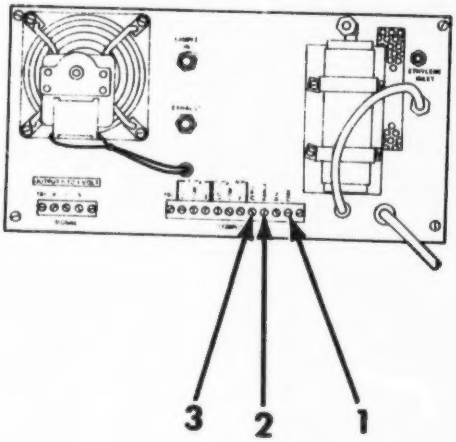
112. Check that O3 CONCENTRATION meter (4) indicates 0 within one minute. If not, go to step 941.

113. Remove jumper wire from TB2 ZERO (3) and connect it to TB2 RANGE (2).

114. Check that O3 CONCENTRATION meter indicates within 5 divisions of reading detemined in step 107. If not, go to step 988.

115. Remove jumper wire from TB2 RANGE (2) and TB2 COM (1).





116. Set FULL SCALE RANGE SELECTOR (5) to 1.

117. Set the POWER switch to OFF.

118. Disconnect AC power from monitor.

119. Set external ozone generator power switch (6) off.

120. Rotate ETHYLENE tank valve fully clockwise.

121. Rotate AIR tank valve fully clockwise.

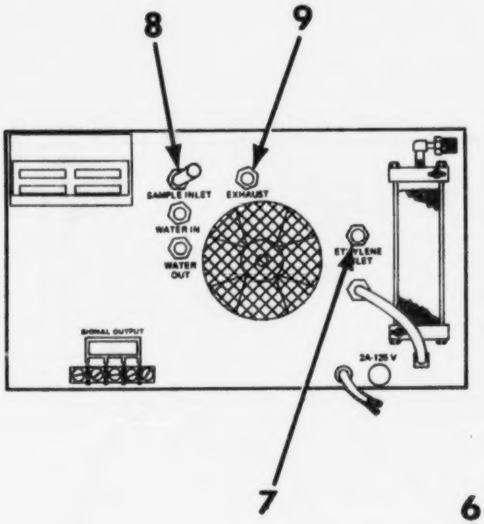
122. Disconnect Ethylene Line from ETHYLENE INLET (7).

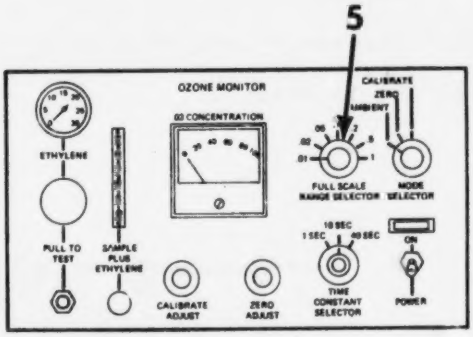
123. Disconnect Sample Line from SAMPLE INLET (8).

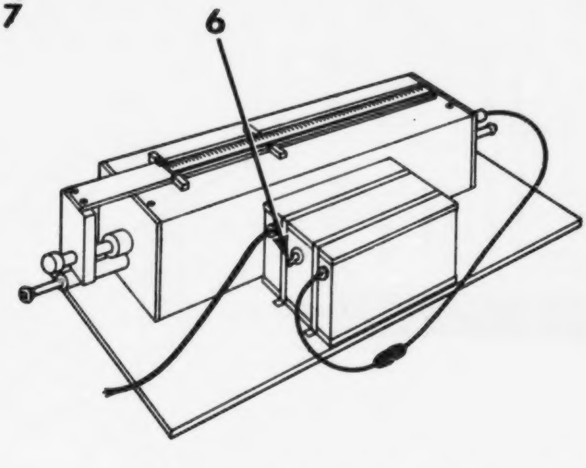
124. Disconnect Exhaust Line from EXHAUST (9).

125. Reinstall top and bottom covers on monitor.

126. END OF CHECKOUT.


8
9
SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
2A-125 V
7


5
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER



127. Disconnect AC power from monitor.

128. Set the POWER switch to OFF.

129. Use VOM to measure OHMS. Connect positive test lead to terminal (4), common test lead to terminal (3).

130. Check that VOM indicates 100K ohms or more. If not, replace SW1 (5). Go to step 132.

131. Repair or replace wiring and connectors as necessary.

132. Reconnect wire to switch.

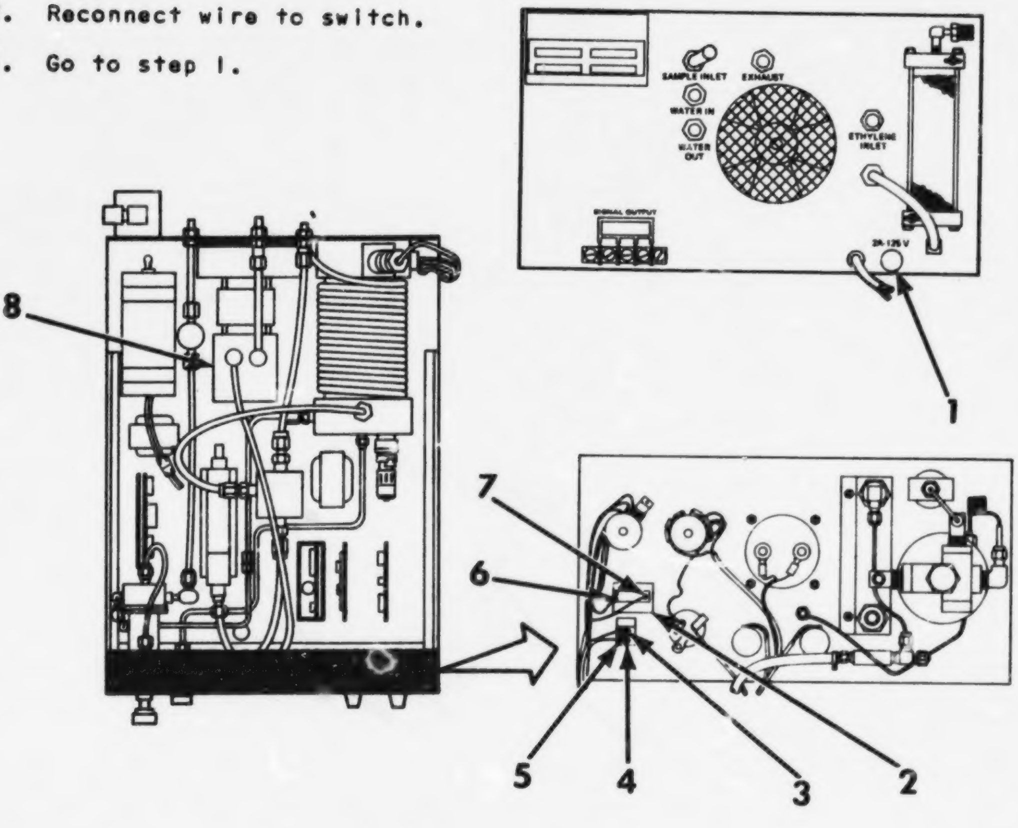
133. Go to step 1.

134. If you are servicing a MOD C monitor, go to step 263. If not, go to next step.

135. Check that pump (8) is operating. If not, go to step 143.

136. Disconnect AC power from monitor.

137. Position monitor chassis on right side.


SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
2A-125V
1
8
7
6
5
4
3
2

138. Use VOM to measure OHMS. Connect positive test lead to DS1 (7), common test lead to TP1 (9).

139. Check that VOM indicates 5 ohms or less. If not, repair or replace wiring and connectors as necessary; go to step 1.

140. Use VOM to measure OHMS. Connect positive test lead to DS1 (6), common test lead to TP1 (9).

141. Check that VOM indicates 5 ohms or less. If not, repair or replace wiring and connectors as necessary; go to step 1.

142. Replace DS1 (2). Go to step 1.

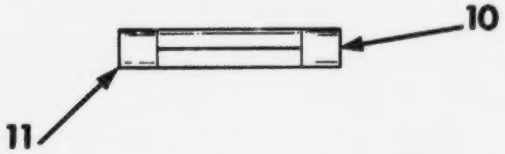
143. Disconnect AC power from monitor.

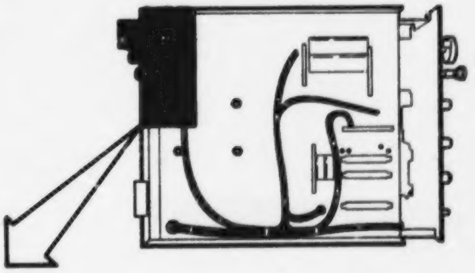
144. Remove fuse F1 (1).

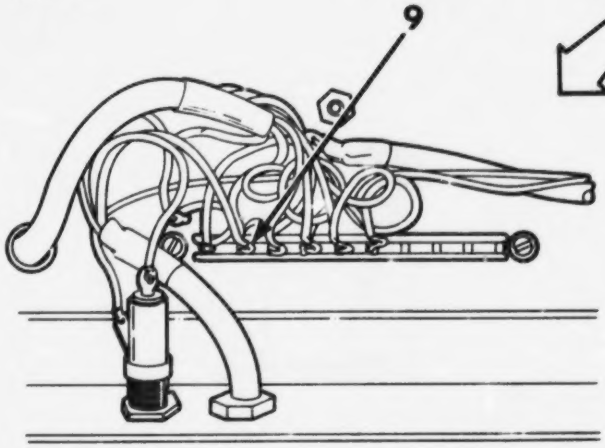
145. Use VOM to measure OHMS. Connect positive test lead to fuse (11), common test lead to fuse (10).

146. Check that VOM indicates 5 ohms or less. If not, go to step 154.

147. Reinstall fuse F1.







148. Position monitor chassis on right side.

149. Use VOM to measure OHMS. Connect positive test lead to fuseholder (2), common test lead to fuseholder (3).

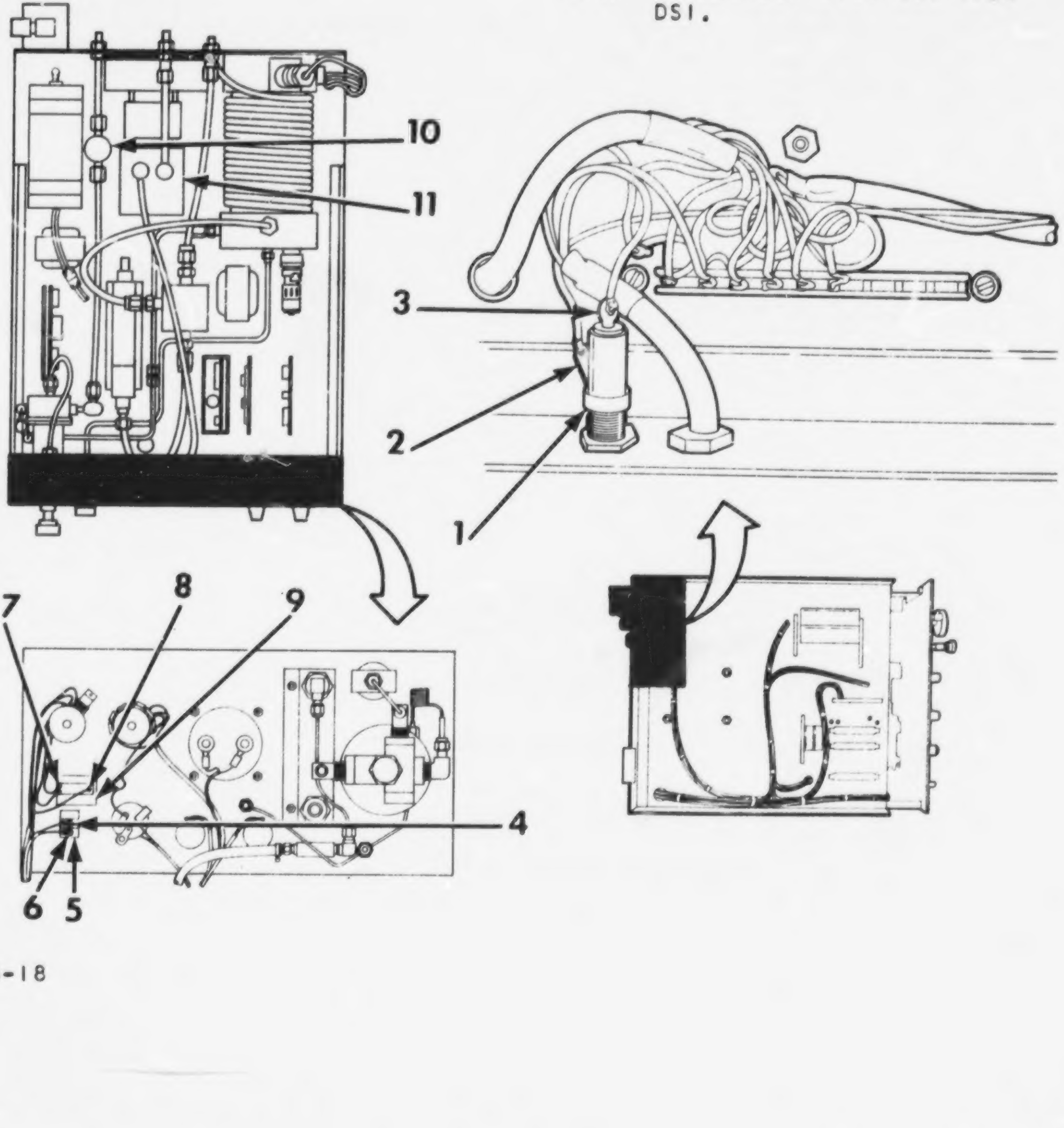
150. Check that VOM indicates 5 ohms or less. If not, replace fuseholder (1). Go to step 1.

151. Use VOM to measure OHMS. Connect positive test lead to switch (6), common test lead to switch (4).

152. Check that VOM indicates 5 ohms or less. If not, replace switch S1 (5). Go to step 1.

153. Repair or replace wiring and connectors as necessary. Go to step 1.

154. Disconnect wire (8) from DS1.



155. Use VOM to measure OHMS. Connect positive test lead to DS1 (8), common test lead to DS1 (7).

156. Check that VOM indicates 100K ohms or more. If not, replace DS1 (9). Go to step 210.

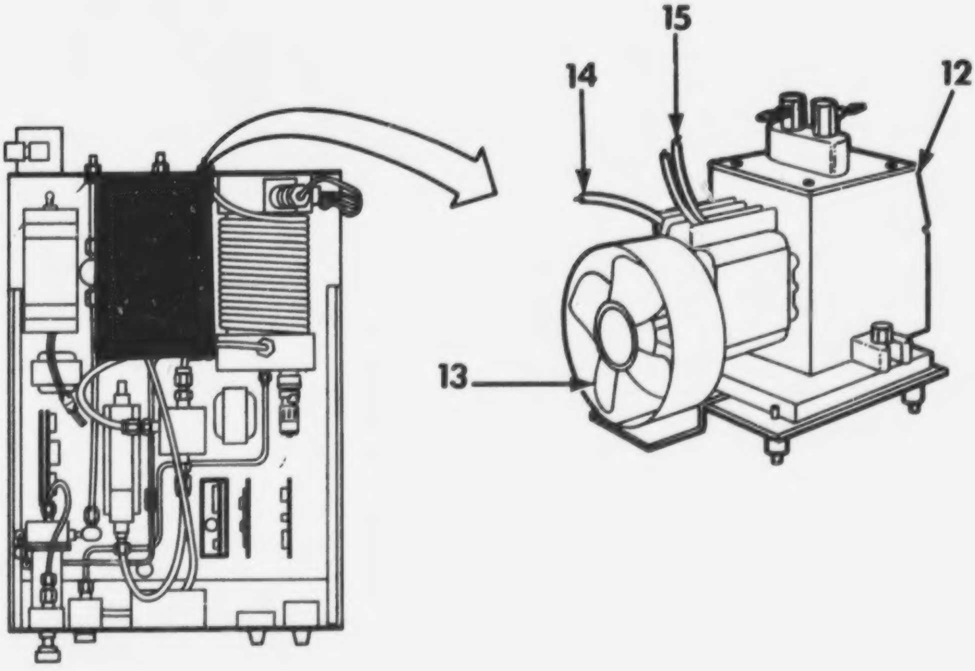
157. Reconnect wire to DS1.

158. Check that pump/fan armature (13) rotates easily. If not, replace pump/fan assembly, go to step 210.

159. Tag and disconnect wiring between Ethylene Solenoid Valve (10) and pump/fan assembly (11).

160. Use VOM to measure OHMS. Connect positive test lead to black wire (14), common test lead to black wire (15).

161. Check that VOM indicates 3 ohms or more. If not, replace pump/fan assembly (12). Go to step 210.



162. Use VOM to measure OHMS. Connect positive test lead to solenoid wire (12), common test lead to solenoid wire (11).

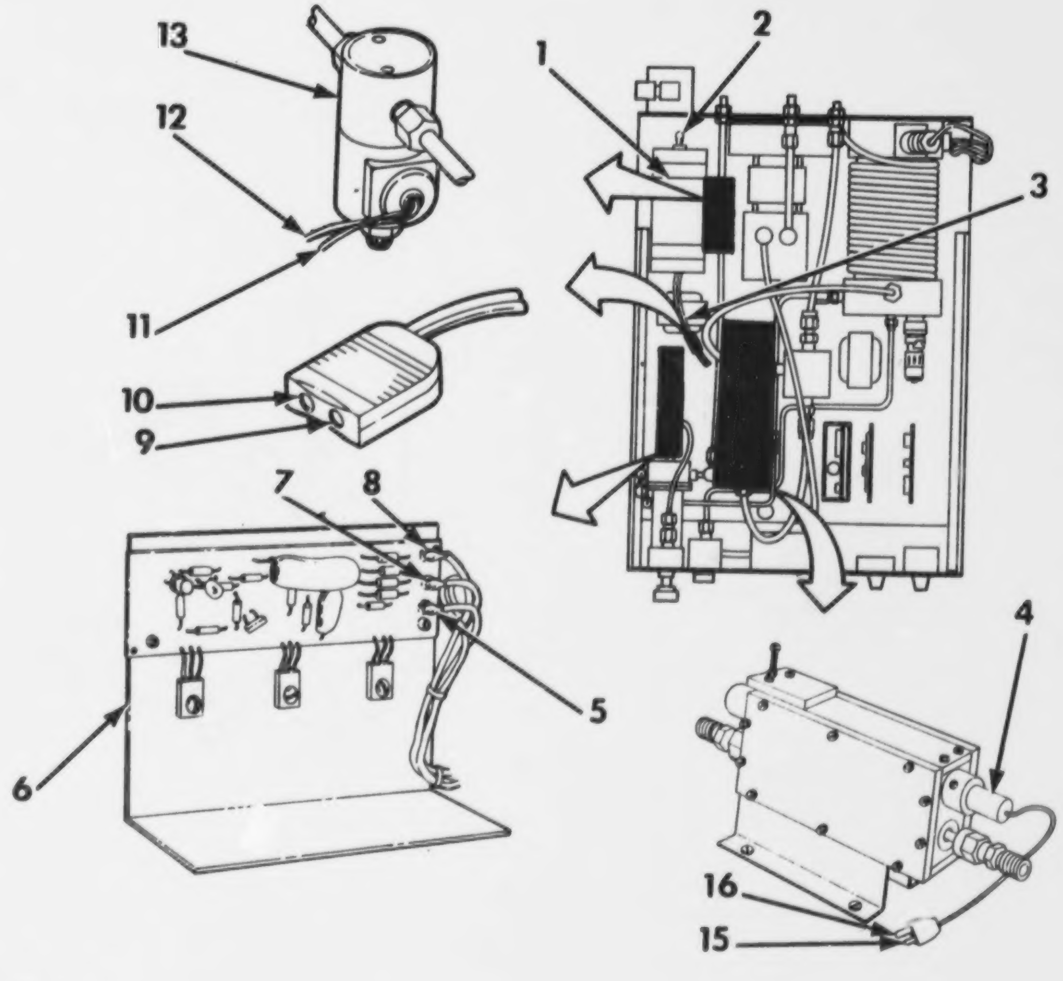
163. Check that VOM indicates 400 ohms or more. If not, replace Ethylene Solenoid Valve (13). Go to step 210.

164. Reconnect wiring between Ethylene Solenoid Valve and pump/fan assembly.

165. Position monitor chassis on right side.

166. Set MODE SELECTOR (14) to AMBIENT.

167. Set power supply switch (2) to OFF.



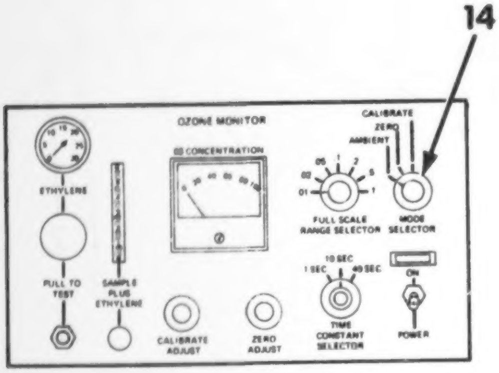
168. Use VOM to measure OHMS. Connect positive test lead to terminal (7), common test lead to terminal (8).

169. Check that VOM indicates 100K ohms or more. If not, replace Constant Voltage Regulator Assembly (6). Go to step 210.

170. Use VOM to measure OHMS. Connect positive test lead to terminal (5), common test lead to terminal (8).

171. Check that VOM indicates 100K ohms. If not, replace Constant Voltage Regulator Assembly (6). Go to step 210.

172. Set power supply switch (2) to ON.


14
OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
01
02
05
1
2
5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER

173. Use VOM to measure OHMS. Connect positive test lead to terminal (5), common test lead to terminal (8).

174. Check that VOM indicates 25 ohms or more. If not, go to step 213.

175. Disconnect lamp cord (3) from power supply.

176. Use VOM to measure OHMS. Connect positive test lead to terminal (10), common test lead to terminal (9).

177. Check that VOM indicates 10K ohms or more. If not, replace UV Power Supply (1). Go to step 210.

178. Use VOM to measure OHMS. Connect positive test lead to plug (15), common test lead to plug (16).

179. Check that VOM indicates 100K ohms or more. If not, replace UV Lamp (4). Go to step 210.

180. Reconnect lamp cord to power supply.

181. Use VOM to measure OHMS. Connect positive test lead to resistor lead (7), common test lead to resistor lead (4).

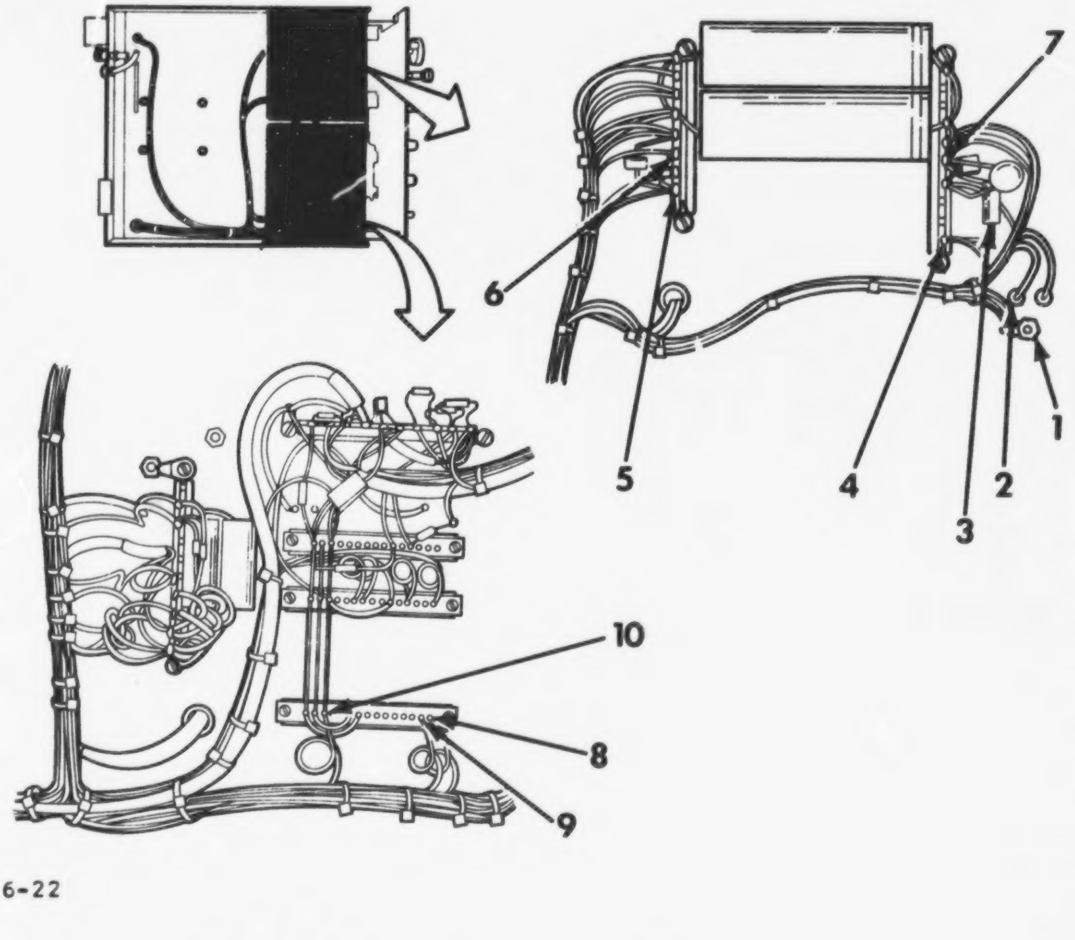
182. Check that VOM indicates between 21 and 23 ohms. If not, replace R19 (3). Go to step 210.

183. Use VOM to measure OHMS. Connect positive test lead to J3-1 (8), common test lead to J3-13 (10).

184. Check that VOM indicates 20K ohms or more. If not, go to step 216.

185. Use VOM to measure OHMS. Connect positive test lead to J3-2 (9), common test lead to J3-13 (10).

186. Check that VOM indicates 700 ohms or more. If not, go to step 216.



187. Remove Temp Control P.C. Board (13).

188. Use VOM to measure OHMS. Connect positive test lead to P.C. Board pin 4 (11), common test lead to P.C. Board pin 1 (12).

189. Check that VOM indicates 15K ohms or more. If not, replace Temp Control P.C. Board (13). Go to step 210.

190. Reinstall Temp Control P.C. Board.

191. Disconnect wire (2) from Q2.

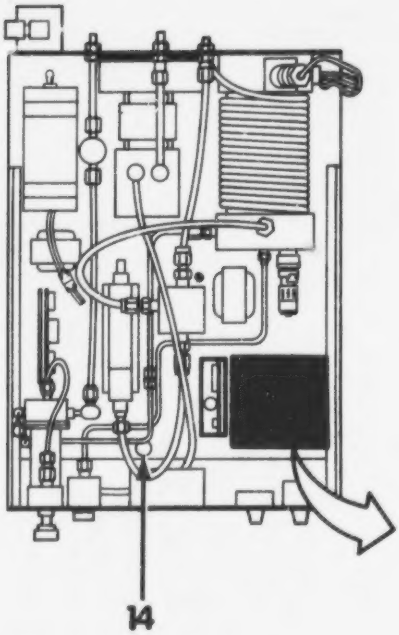
192. Use VOM to measure OHMS. Connect positive test lead to terminal (1), common test lead to terminal (2).

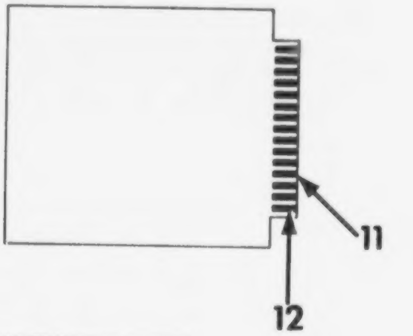
193. Check that VOM indicates 200K ohms or more. If not, replace Q2 (14). Go to step 210.

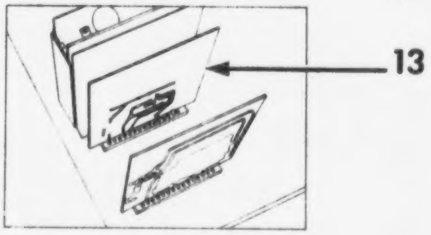
194. Reconnect wire to Q2.

195. Use VOM to measure OHMS. Connect positive test lead to diode lead (5), common test lead to diode lead (6).

196. Check that VOM deflects sharply to 0, then increases to 500 ohms or more. If not, go to step 236.







197. Disconnect transformer wire (1) from TP4-terminal.

198. Use VOM to measure OHMS. Connect positive test lead to transformer lead (1), common test lead to TP4 (2).

199. Check that VOM indicates 25 ohms or more. If not, replace T2 (3). Go to step 210.

200. Reconnect wire to TP4.

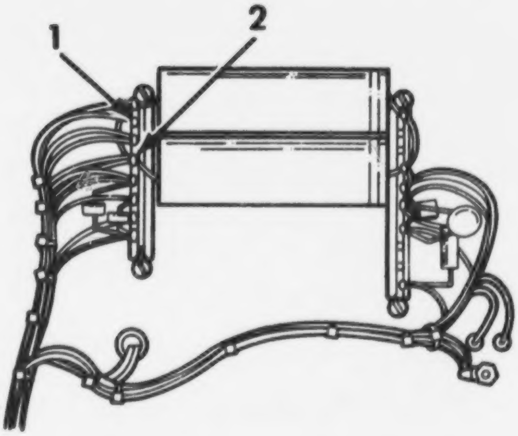
201. Disconnect transformer wire (9) from TP2 terminal.

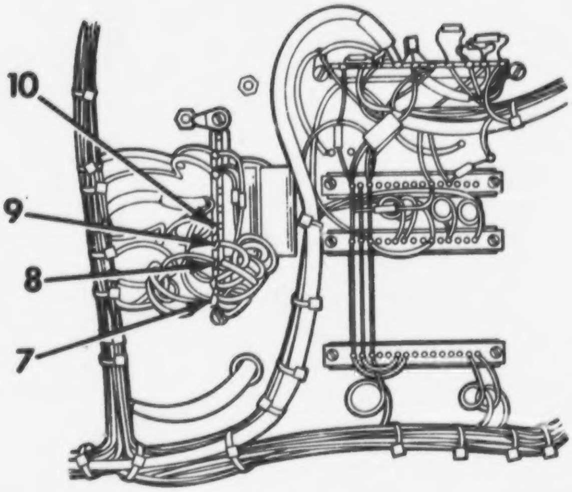
202. Use VOM to measure OHMS. Connect positive test lead to transformer lead (9), common test lead to TP2 terminal (8).

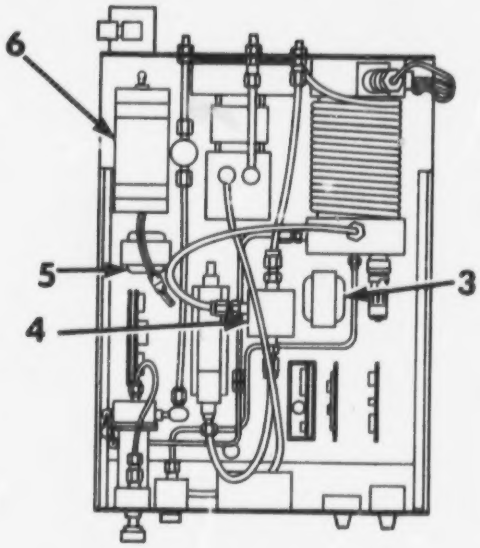
203. Check that VOM indicates 6 ohms or more. If not, replace T1 (5). Go to step 210.

204. Reconnect wire to TP2.

205. Disconnect solenoid wire (10) from TP2.







206. Use VOM to measure OHMS. Connect positive test lead to solenoid lead (10), common test lead to TP2 terminal (7).

207. Check that VOM indicates 85 ohms or more. If not, replace Selector Solenoid Valve (4). Go to step 210.

208. Reconnect solenoid lead to TP2.

209. Repair or replace wiring and connectors as necessary. Go to step 210.

210. Position monitor chassis in normal operating position.

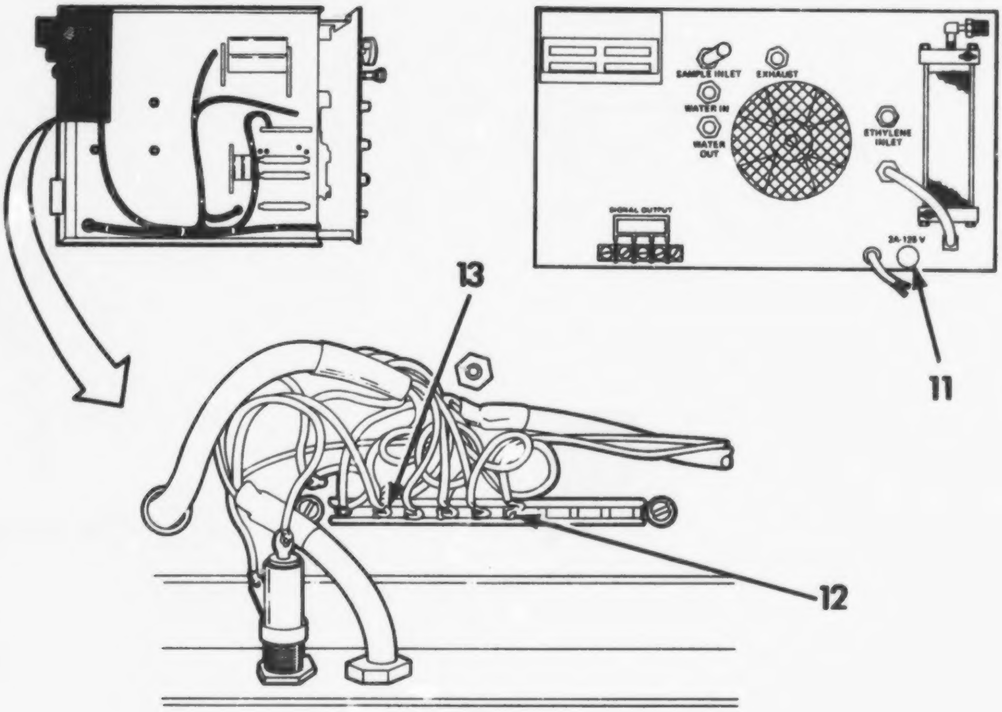
211. Install new 2A-125V fuse in fuseholder (11).

212. Go to step 1.

213. Use VOM to measure OHMS. Connect positive test lead to TP1-2 (13), common test lead to TP1-6 (12).

214. Check that VOM indicates 25 ohms or more. If not, replace UV Lamp Power Supply (6). Go to step 210.

215. Repair or replace wiring and connectors as necessary. Go to step 210.


SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
2A-125V
13
11
12

216. Remove 110 VDC Power Supply P.C. Board (4).

217. Disconnect black wire from TP2 (9).

218. Use VOM to measure OHMS. Connect positive test lead to TP2 (8), common test lead to black wire (9).

219. Check that VOM indicates 11 ohms or more. If not, replace T1 (5). Go to step 210.

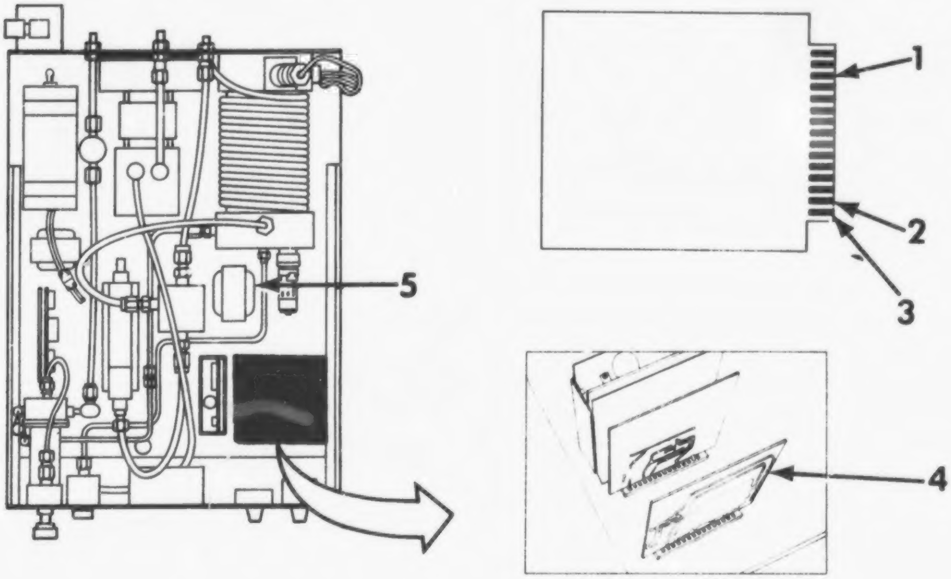
220. Disconnect diode lead (11) from TP2.

221. Use VOM to measure OHMS. Connect positive test lead to TP2 terminal (9), common test lead to TP2 terminal (10).

222. Check that VOM indicates 100K ohms or more. If not, replace CR2 (12). Go to step 253.

223. Use VOM to measure OHMS. Connect positive test lead to TP2 terminal (9), common test lead to diode lead (11).

224. Check that VOM indicates 100K ohms or more. If not, replace CR1 (13). Go to step 253.



225. Use VOM to measure OHMS. Connect positive test lead to TP2 terminal (8), common test lead to TP2 terminal (10).

226. Check that VOM deflects sharply to 0, then increases to 100K ohms or more. If not, replace C6 (7), go to step 253.

227. Use VOM to measure OHMS. Connect positive test lead to TP2 terminal (10), common test lead to TP2 terminal (8).

228. Check that VOM deflects sharply to 0, then increases to 100K ohms or more. If not, replace c7 (6), go to step 253.

229. Reconnect black wire to TP2.

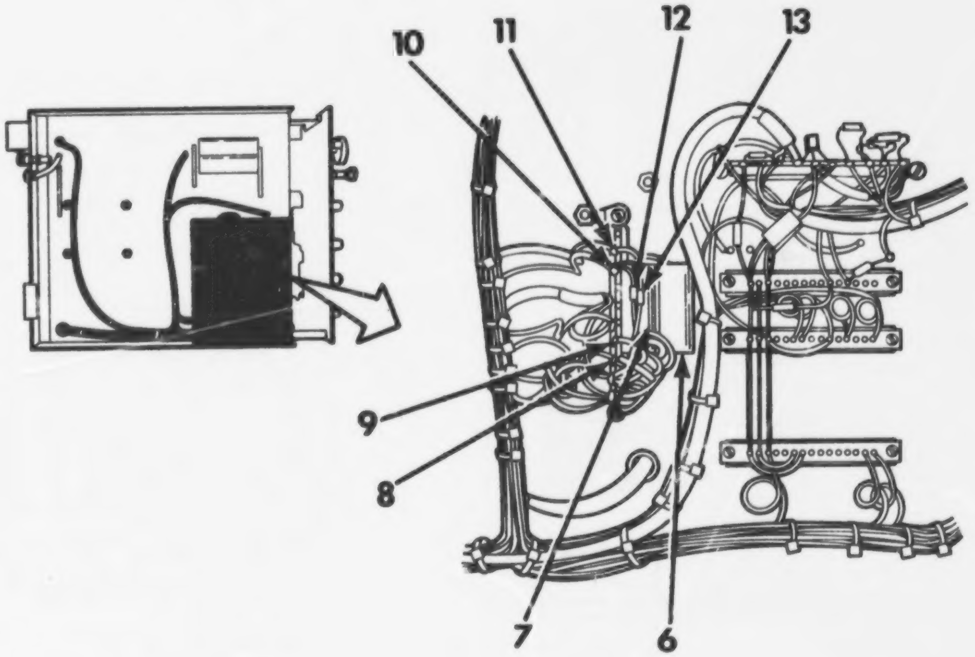
230. Reconnect diode lead to TP2.

231. Use VOM to measure OHMS. Connect positive test lead to P.C. Board (3), common test lead to P.C. Board (1).

232. Check that VOM indicates 150K ohms or more. If not, replace 110 VDC Power Supply P.C. Board (4). Go to step 210.

233. Use VOM to measure OHMS. Connect positive test lead to P.C. Board (2), common test lead to P.C. Board (1).

234. Check that VOM indicates 150K ohms or more. If not, replace 110 VDC Power Supply P.C. Board (4). Go to step 210.



235. Repair or replace wiring and connectors as necessary. Go to step 210.

236. Disconnect green wire from TP4 terminal (4).

237. Use VOM to measure OHMS. Connect positive test lead to TP4 terminal (7), common test lead to green wire (4).

238. Check that VOM indicates 0.5 ohms or more. If not, replace T2 (1). Go to step 210.

239. Disconnect diode lead (7) from TP4 terminal.

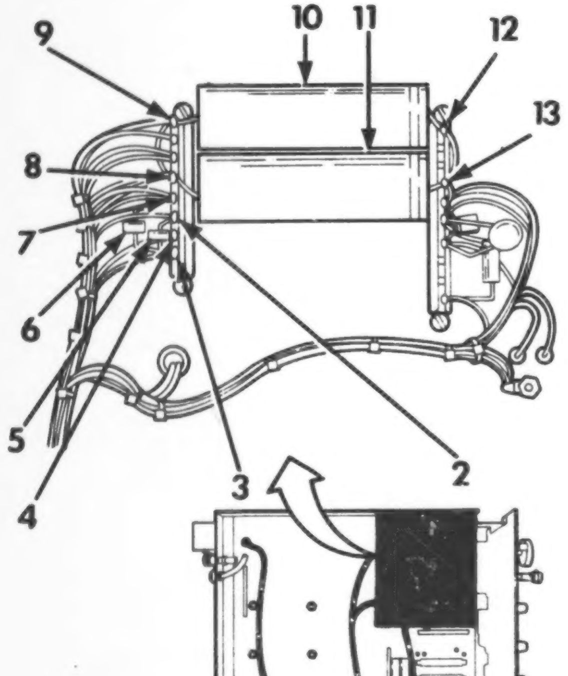
240. Use VOM to measure OHMS. Connect positive test lead to TP4 terminal (3), common test lead to diode lead (7).

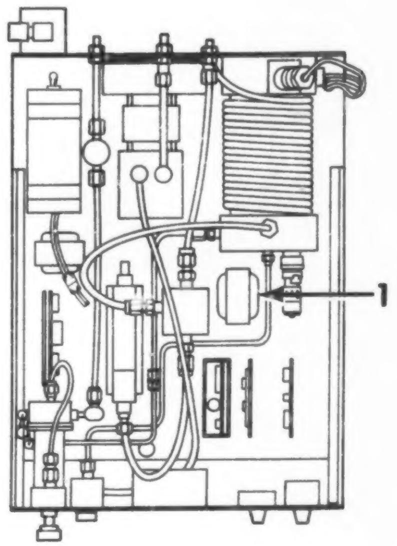
241. Check that VOM indicates 100K ohms or more. If not, replace CR3 (6). Go to step 259.

242. Disconnect diode lead (2) from TP4.

243. Use VOM to measure OHMS. Connect positive test lead to TP4 terminal (3), common test lead to diode lead (2).

244. Check that VOM indicates 100K ohms or more. If not, replace CR4 (5). Go to step 259.





245. Reconnect diode leads to TP4.

246. Disconnect wire (12) from TP5 terminal.

247. Use VOM to measure OHMS. Connect positive test lead to TP5 terminal (12), common test lead to TP4 terminal (9).

248. Check that VOM deflects sharply to 0, then increases to 10K ohms or more. If not, replace C8 (10), go to step 210.

249. Use VOM to measure OHMS. Connect positive test lead to TP5 (13), common test lead to TP4 (8).

250. Check that VOM deflects sharply to 0, then increases to 10K ohms or more. If not, replace C9 (11), go to step 210.

251. Reconnect wire to TP4.

252. Repair or replace wiring and connectors as necessary. Go to step 210.

253. Reconnect black wire to TP2.

254. Reconnect diode lead to TP2.

255. Reinstall 110 VDC Power Supply P.C. Board.

256. Position monitor chassis in normal operating position.

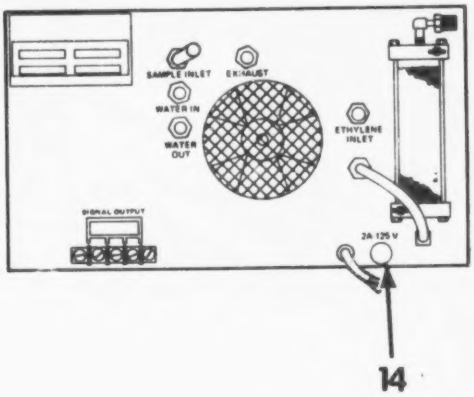
257. Install new 2A-125V fuse in fuseholder (14).

258. Go to step 1.

259. Reconnect diode leads to TP4.

260. Position monitor chassis in normal operating position.

261. Install new 2A-125V fuse in fuseholder (14).



262. Go to step 1.

263. Check that pump (1) is operating. If not, go to step 272.

264. Disconnect AC power from monitor.

265. Position monitor chassis on right side.

266. Disconnect wires from S1 (9).

267. Use VOM to measure OHMS. Connect positive test lead to DS1 (11), common test lead to wire end (9).

268. Check that VOM indicates 5 ohms or less. If not, repair or replace wiring and connectors as necessary; go to step 1.

269. Use VOM to measure OHMS. Connect positive test lead to DS1 (12), common test lead to S1 (3).

270. Check that VOM indicates 5 ohms or less. If not, repair or replace wiring and connectors as necessary; go to step 1.

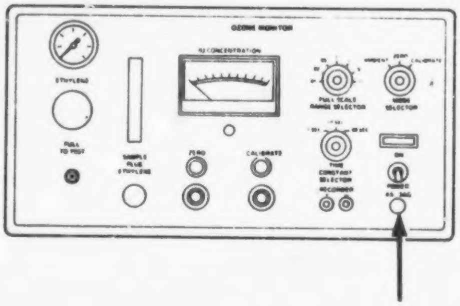
271. Replace DS1 (13). Go to step 1.

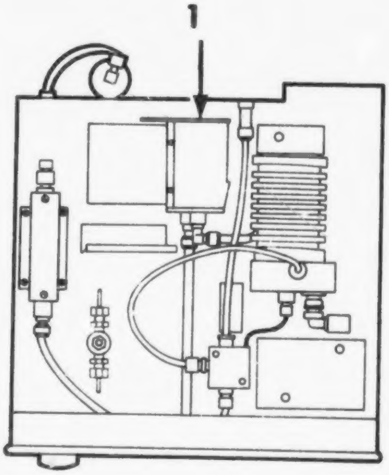
272. Disconnect AC power from monitor.

273. Remove fuse F1 (2).

274. Use VOM to measure OHMS. Connect positive test lead to fuse (15), common test lead to fuse (14).

275. Check that VOM indicates 5 ohms or less. If not, go to step 285.


OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
ZERO
CALIBRATE
FULL SCALE RANGE SELECTOR
AMBIENT
ZERO
CALIBRATE
MODE SELECTOR
TIME CONSTANT SELECTOR
RECORDER
ON
POWER



276. Reinstall fuse F1.

277. Position monitor chassis on right side.

278. Use VOM to measure OHMS. Connect positive test lead to fuseholder (5), common test lead to fuseholder (6).

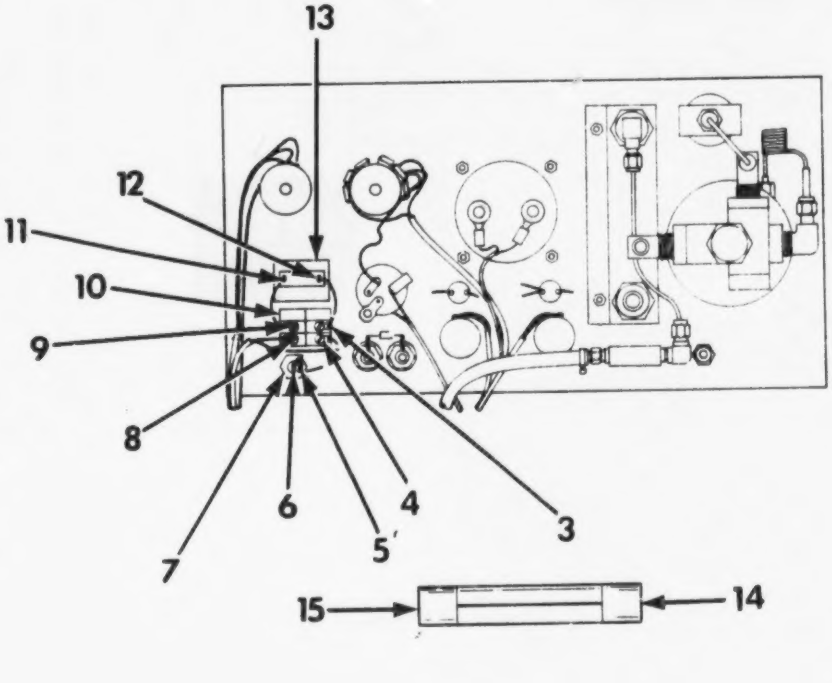
279. Check that VOM indicates 5 ohms or less. If not, replace fuseholder (7). Go to step 1.

280. Use VOM to measure OHMS. Connect positive test lead to switch (8), common test lead to switch (9).

281. Check that VOM indicates 5 ohms or less. If not, replace switch S1 (10). Go to step 1.

282. Use VOM to measure OHMS. Connect positive test lead to switch (3), common test lead to switch (4).

283. Check that VOM indicates 5 ohms or less. If not, replace switch S1 (10). Go to step 1.

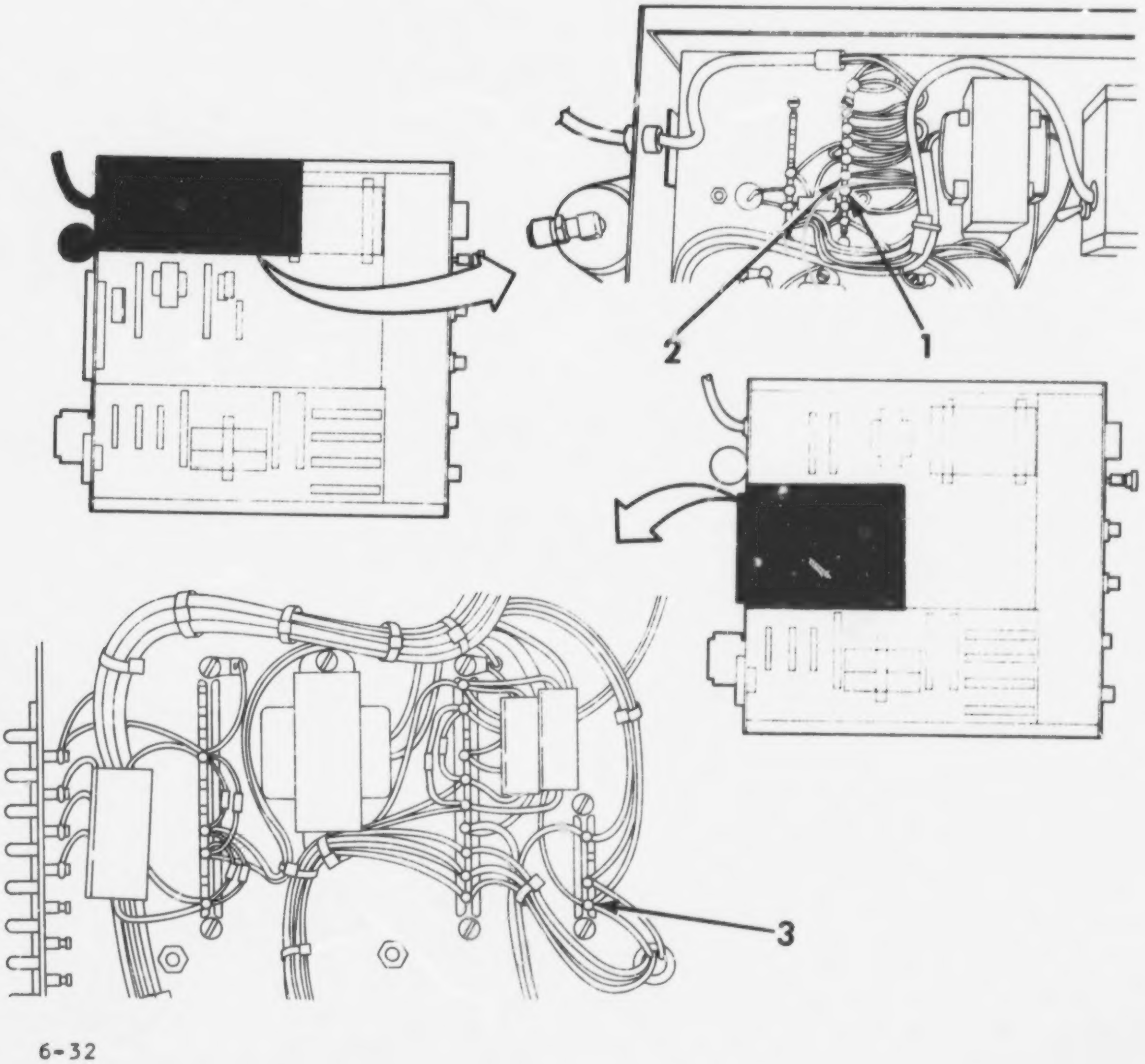


284. Repair or replace wiring and connectors as necessary. Go to step 1.

285. Disconnect wire (5) from DS1.

286. Use VOM to measure OHMS. Connect positive test lead to DS1 (5), common test lead to DS1 (6).

287. Check that VOM indicates 100K ohms or more. If not, replace DS1 (7). Go to step 367.



288. Reconnect wire to DS1.

289. Disconnect cooling fan wire (1) from TP1_6.

290. Use VOM to measure OHMS. Connect positive test lead to wire end (1), common test lead to TP18-4 (3).

291. Check that VOM indicates 25 ohms or more. If not, replace Cooling Fan (8). Go to step 367.

292. Reconnect wire to TP1.

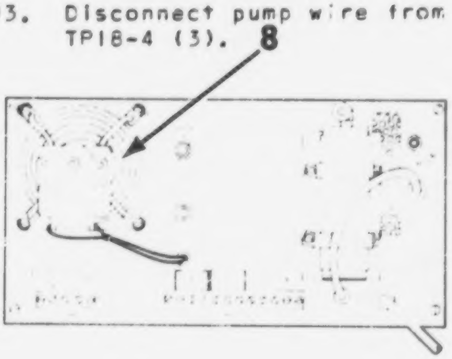
293. Disconnect pump wire from TP18-4 (3).

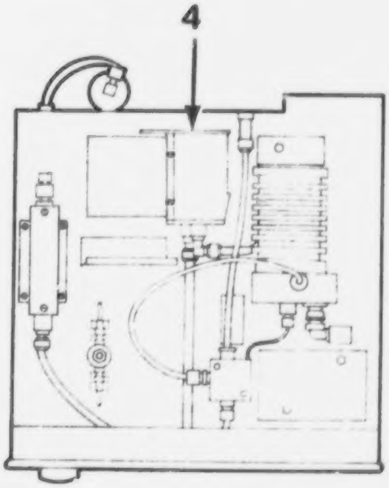
294. Use VOM to measure OHMS. Connect positive test lead to TP1-5 (2), common test lead to wire end (3).

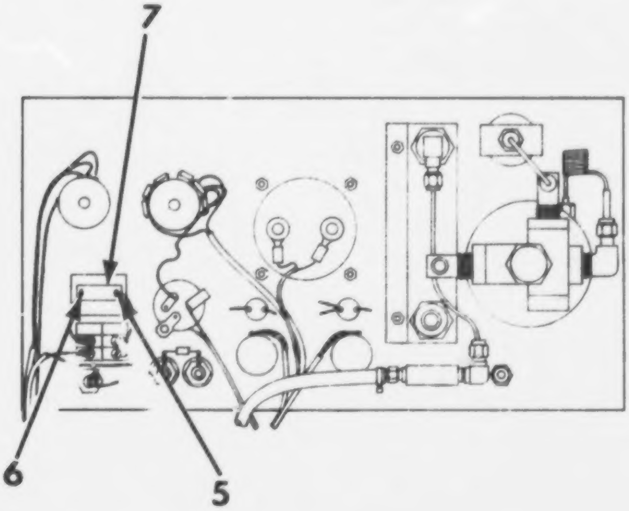
295. Check that VOM indicates 3 ohms or more. If not, replace Evacuation Pump (4). Go to step 367.

296. Use VOM to measure OHMS. Connect positive test lead to TP1-6 (1), common test lead to wire end (3).

297. Check that VOM indicates 3 ohms or more. If not, replace Evacuation Pump (4). Go to step 367.







298. Reconnect wire to TP1.

299. Use VOM to measure OHMS. Connect positive test lead to resistor lead (2), common test lead to resistor lead (5).

300. Check that VOM indicates 2.5 ohms or more. If not, replace R23 (4). Go to step 371.

301. Disconnect varistor lead (7) from TP13-6.

302. Use VOM to measure OHMS. Connect positive test lead to varistor lead (7), common test lead to TP13-7 (5).

303. Check that VOM indicates 100K ohms or more. If not, replace R35 (6). Go to step 367.

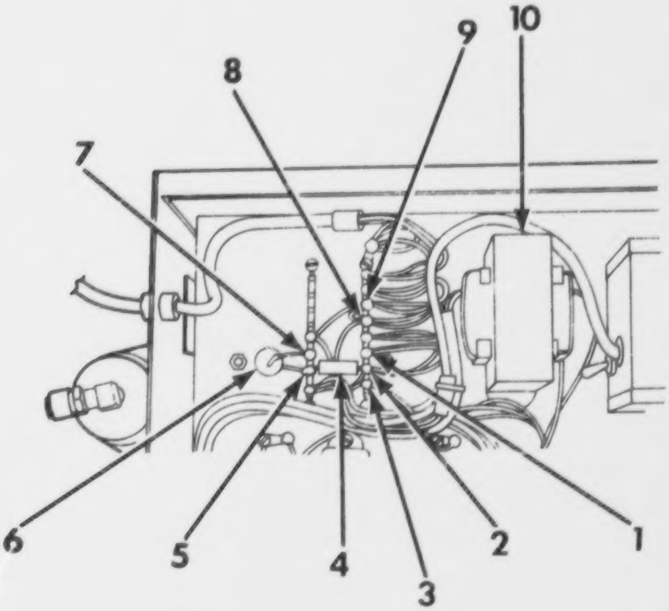
304. Reconnect varistor lead to TP13-6.

305. Disconnect red wire (8) from TP1-4.

306. Use VOM to measure OHMS. Connect positive test lead to red wire (8), common test lead to TP1-6 (1).

307. Check that VOM indicates 25 ohms or more. If not, replace T2 (10). Go to step 371.

308. Reconnect red wire to TP1-4.



309. Disconnect black wire (12) from TP18-3.

310. Use VOM to measure OHMS. Connect positive test lead to black wire (12), common test lead to TP18-4 (13).

311. Check that VOM indicates 25 ohms or more. If not, replace T3 (14). Go to step 367.

312. Reconnect black wire to TP18.

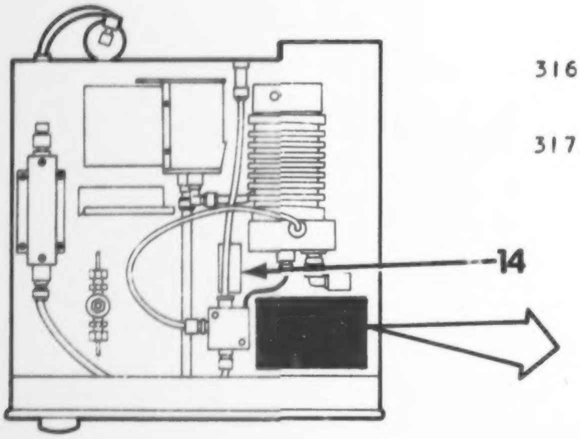
313. Disconnect yellow wire (2) from TP1-7.

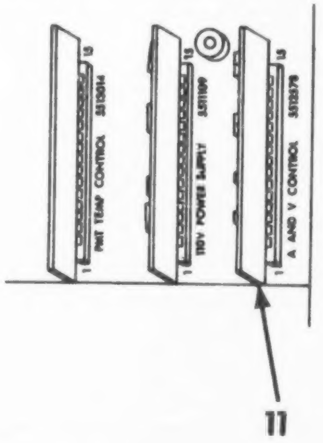
314. Use VOM to measure OHMS. Connect positive test lead to wire end (2), common test lead to TP1-3 (9).

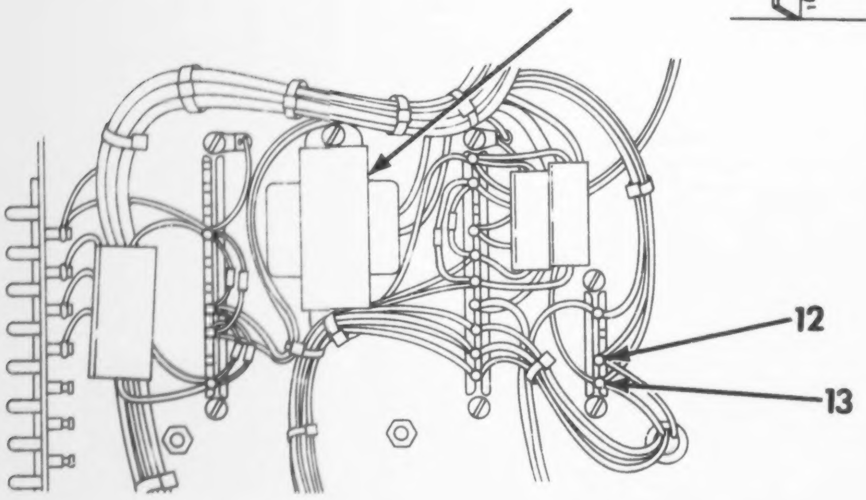
315. Check that VOM indicates 110 ohms or more. If not, replace T4 (15). Go to step 371.

316. Reconnect yellow wire to TP1-7.

317. Remove Alarm and Valve Control P.C. Board (11).







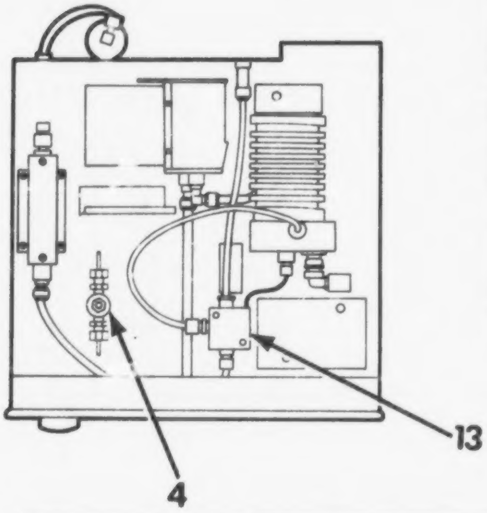
318. Use VOM to measure OHMS. Connect positive test lead to TP13-8 (3), common test lead to J4-4 (2).

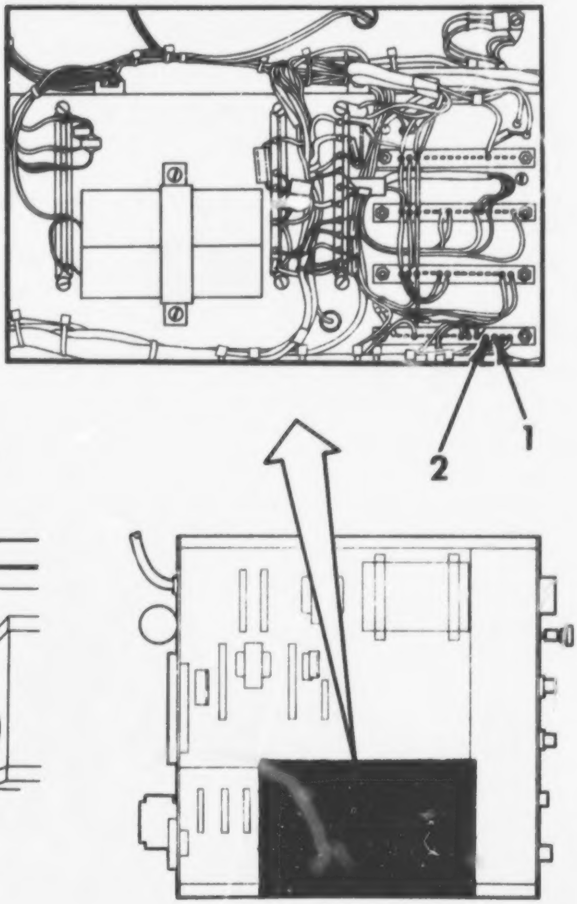
319. Check that VOM indicates 400 ohms or more. If not, replace Ethylene Solenoid Valve (4). Go to step 374.

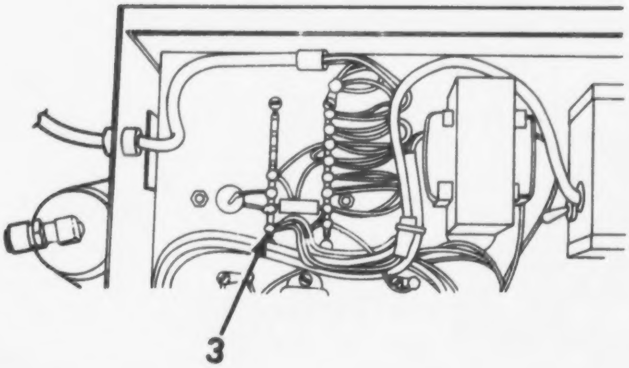
320. Use VOM to measure OHMS. Connect positive test lead to TP18-1 (6), common test lead to J4-3 (1).

321. Check that VOM indicates 10K ohms or more. If not, replace Selector Solenoid Valve (13). Go to step 374.

322. Set MODE SELECTOR (5) to AMBIENT.





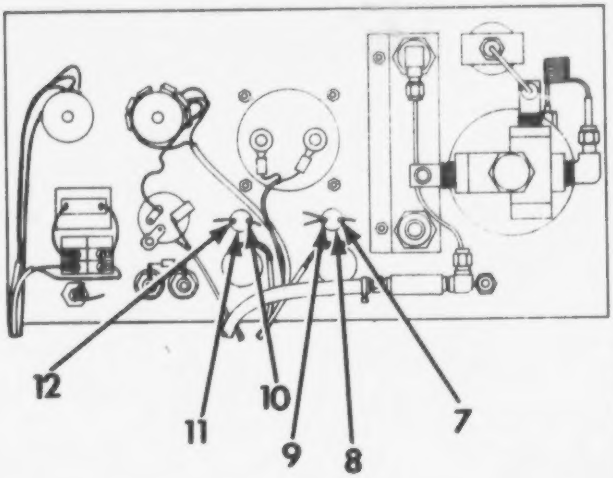


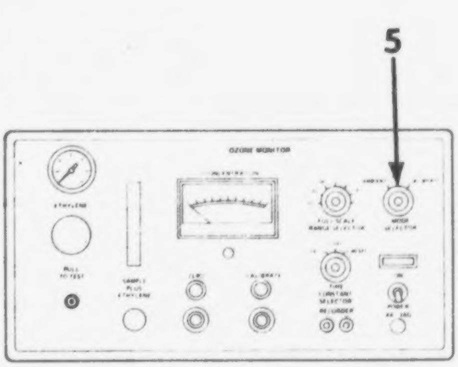
323. Use VOM to measure OHMS. Connect positive test lead to DS2 (10), common test lead to DS2 (12).

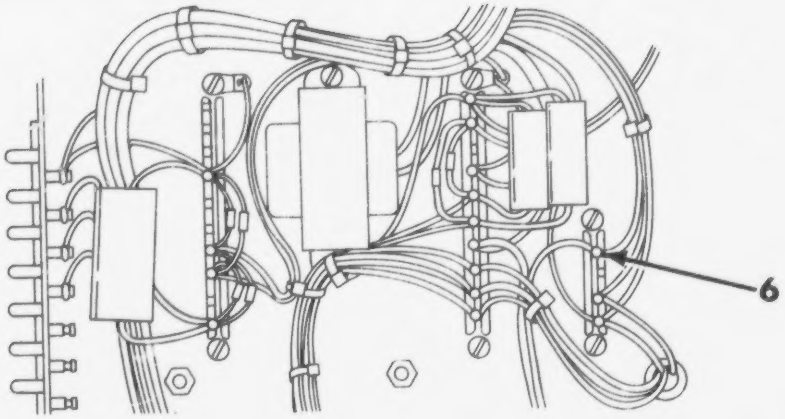
324. Check that VOM indicates 300 ohms or more. If not, replace DS2 (11). Go to step 374.

325. Use VOM to measure OHMS. Connect positive test lead to DS3 (9), common test lead to DS3 (7).

326. Check that VOM indicates 300 ohms or more. If not, replace DS3 (8). Go to step 374.




5
OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE
FULL SCALE RANGE SELECTOR
METER SELECTOR
TIME CONSTANT SELECTOR
RECORDER
POWER



327. Use VOM to measure OHMS. Connect positive test lead to P.C. Board terminal 7 (1), common test lead to P.C. Board terminal 13 (4).

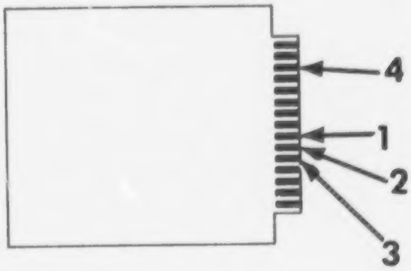
328. Check that VOM indicates 85K ohms or more. If not, replace Alarm and Valve Control P.C. Board (5). Go to step 371.

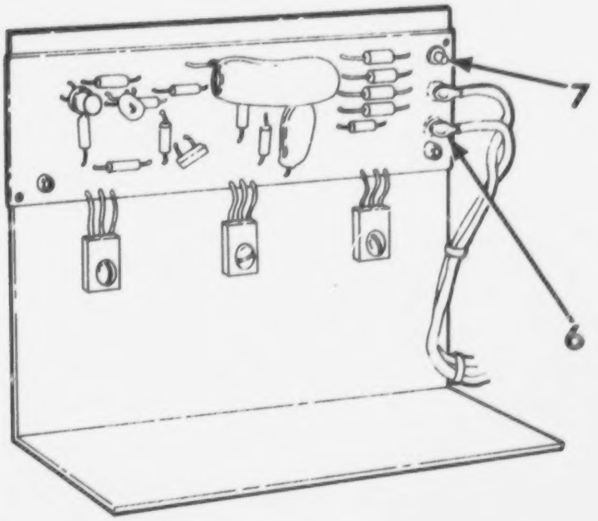
329. Use VOM to measure OHMS. Connect positive test lead to P.C. Board terminal 6 (2), common test lead to P.C. Board terminal 13 (4).

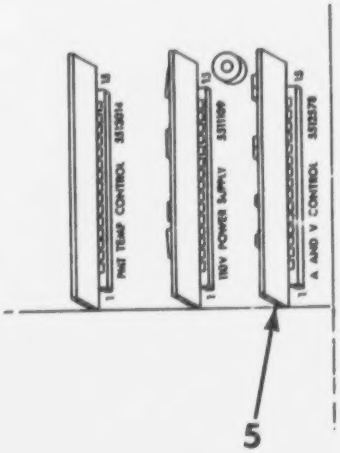
330. Check that VOM indicates 80K ohms or more. If not, replace Alarm and Valve Control P.C. Board (5). Go to step 371.

331. Use VOM to measure OHMS. Connect positive test lead to P.C. Board terminal 5 (3), common test lead to P.C. Board terminal 13 (4).

332. Check that VOM indicates 85K ohms or more. If not, replace Alarm and Valve Control P.C. Board (5). Go to step 371.






13
PMT TEMP CONTROL 3312014
1
13
110V POWER SUPPLY 3311109
1
13
A AND V CONTROL 3312370
1
5

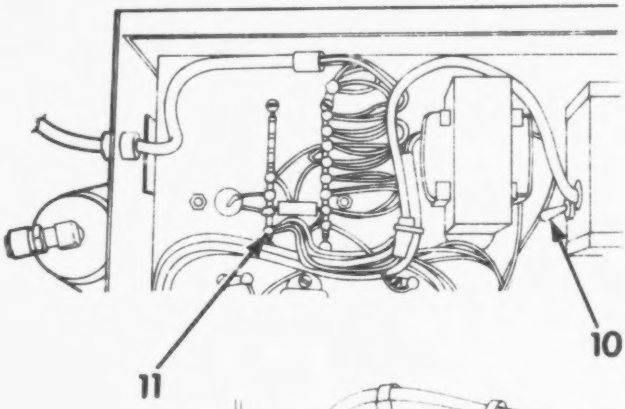
333. Use VOM to measure OHMS. Connect positive test lead to terminal (6), common test lead to TP18-4 (9).

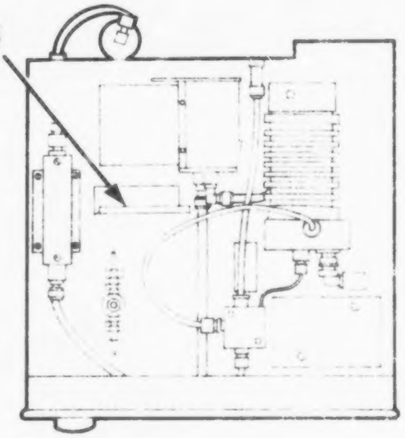
334. Check that VOM indicates 30K ohms or more. If not, replace AC Current Regulator P.C. Board (8). Go to step 374.

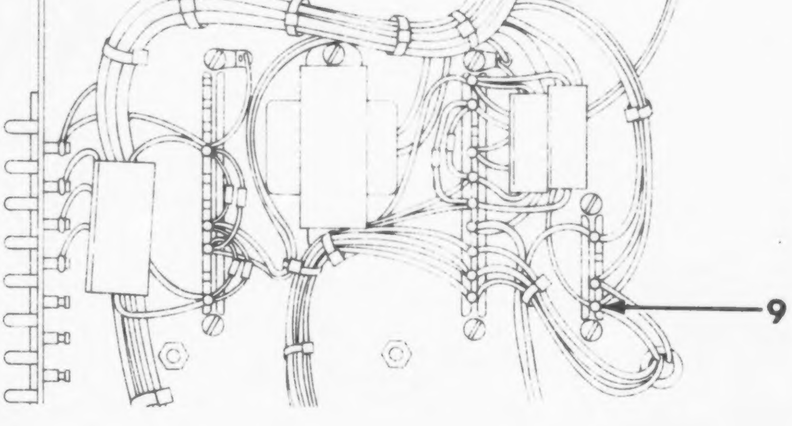
335. Set power supply switch (10) to OFF.

336. Use VOM to measure OHMS. Connect positive test lead to terminal (7), common test lead to TP18-4 (9).

337. Check that VOM indicates 100K ohms or more. If not, replace AC Current Regulator P.C. Board (8). Go to step 374.







338. Set power supply switch (6) to ON.

339. Reinstall Alarm and Valve Control P.C. Board.

340. Disconnect lamp cord (15) from power supply.

341. Use VOM to measure OHMS. Connect positive test lead to terminal (5), common test lead to terminal (4).

342. Check that VOM indicates 10K ohms or more. If not, replace UV Power Supply (13). Go to step 371.

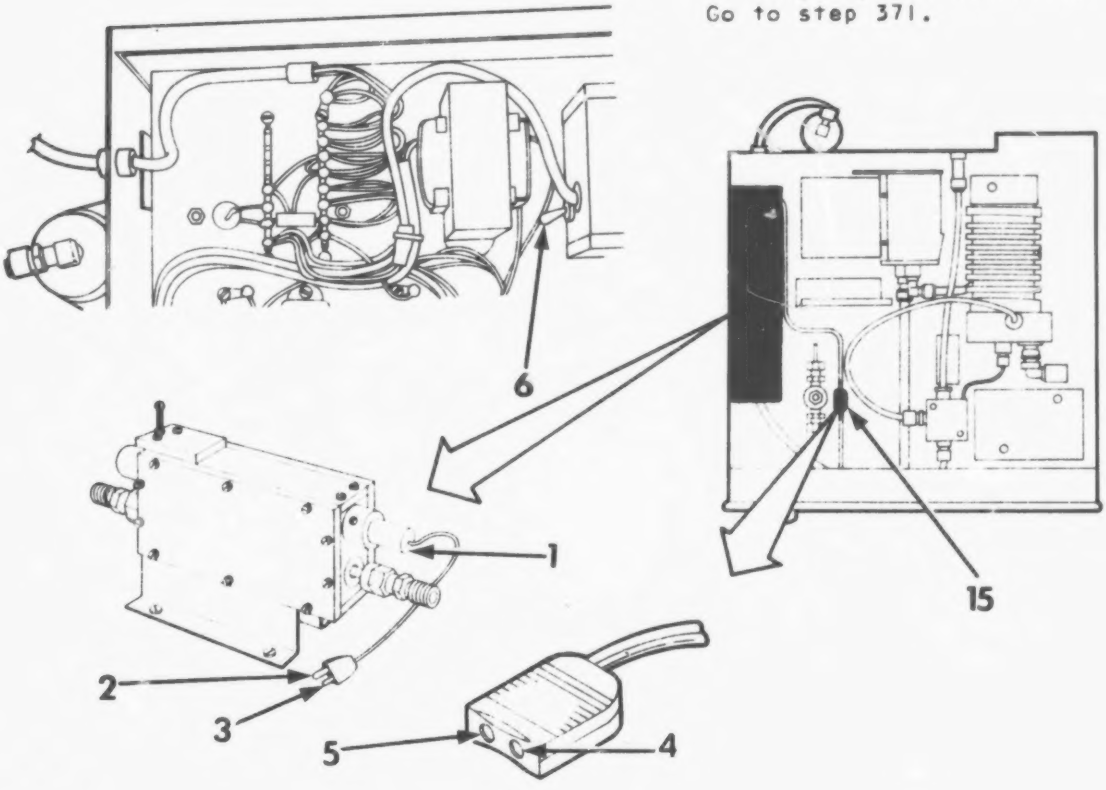
343. Use VOM to measure OHMS. Connect positive test lead to plug (2), common test lead to plug (3).

344. Check that VOM indicates 100K ohms or more. If not, replace UV Lamp (1). Go to step 371.

345. Reconnect lamp cord to power supply.

346. Use VOM to measure OHMS. Connect positive test lead to resistor lead (12), common test lead to resistor lead (10).

347. Check that VOM indicates between 21 and 23 ohms. If not, replace R19 (11). Go to step 371.



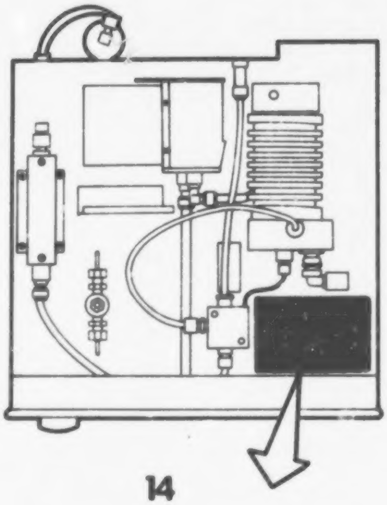
348. Use VOM to measure OHMS. Connect positive test lead to J3-1 (7), common test lead to J3-13 (9).

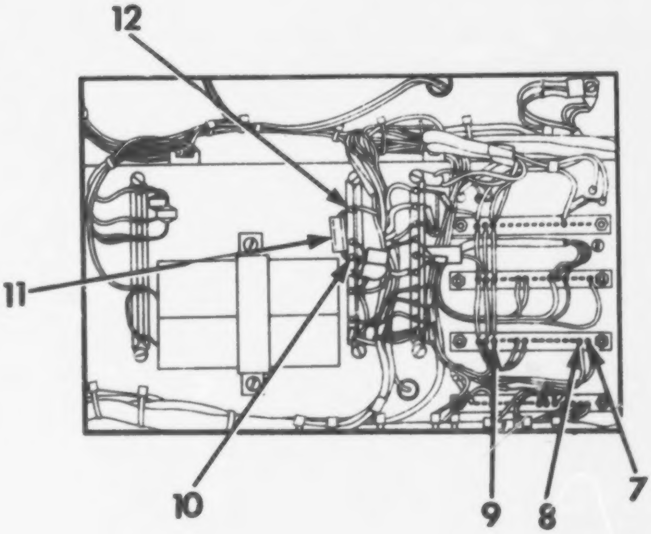
349. Check that VOM indicates 20K ohms or more. If not, go to step 378.

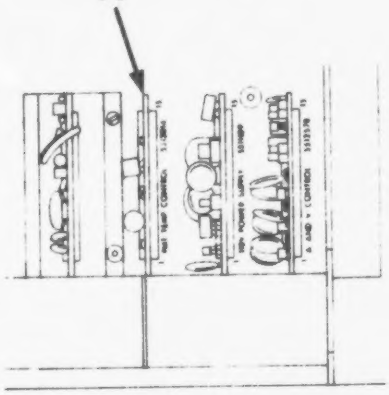
350. Use VOM to measure OHMS. Connect positive test lead to J3-2 (8), common test lead to J3-13 (9).

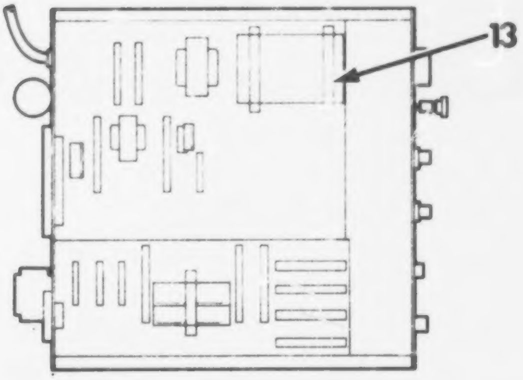
351. Check that VOM indicates 600 ohms or more. If not, go to step 378.

352. Remove Temp Control P.C. Board (14).









353. Use VOM to measure OHMS. Connect positive test lead to P.C. Board pin 4 (1), common test lead to P.C. Board pin 1 (2).

354. Check that VOM indicates 15K ohms or more. If not, replace Temp Control P.C. Board (3). Go to step 371.

355. Reinstall Temp Control P.C. Board.

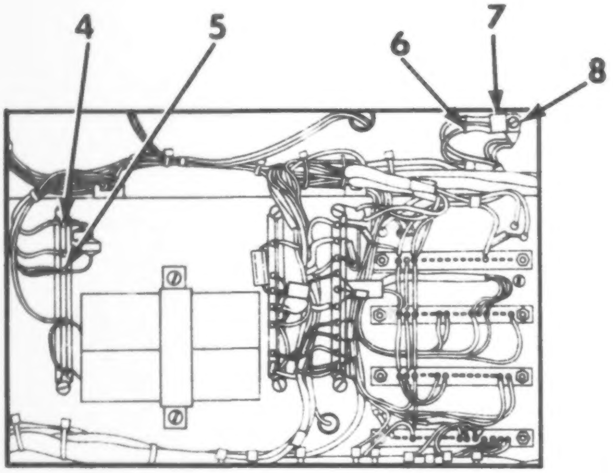
356. Disconnect wire (6) from Q2.

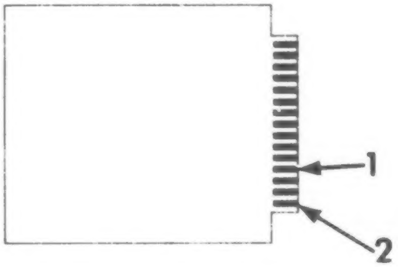
357. Use VOM to measure OHMS. Connect positive test lead to terminal (8), common test lead to terminal (6).

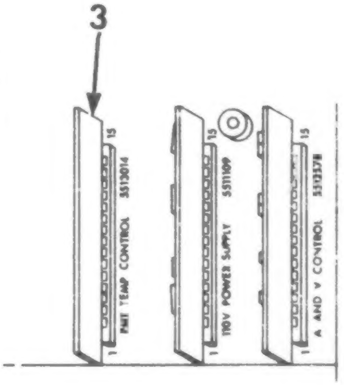
358. Check that VOM indicates 170K ohms or more. If not, replace Q2 (7). Go to step 371.

359. Reconnect wire to Q2.

360. Use VOM to measure OHMS. Connect positive test lead to diode lead (4), common test lead to diode lead (5).






3
15
PMT TEMP CONTROL 5512014
1
15
110V POWER SUPPLY 5511109
1
15
A AND V CONTROL 5512578
1

361. Check that VOM deflects sharply to 0, then increases to 500 ohms or more. If not, go to step 398.

362. Use VOM to measure OHMS. Connect positive test lead to TP2-10 (9), common test lead to TP2-8 (10).

363. Check that VOM deflects sharply to 0, then increases to 12K ohms or more. If not, go to step 416.

364. Use VOM to measure OHMS. Connect positive test lead to TP2-7 (11), common test lead to TP2-4 (12).

365. Check that VOM deflects sharply to 0, then increases to 12K ohms or more. If not, go to step 416.

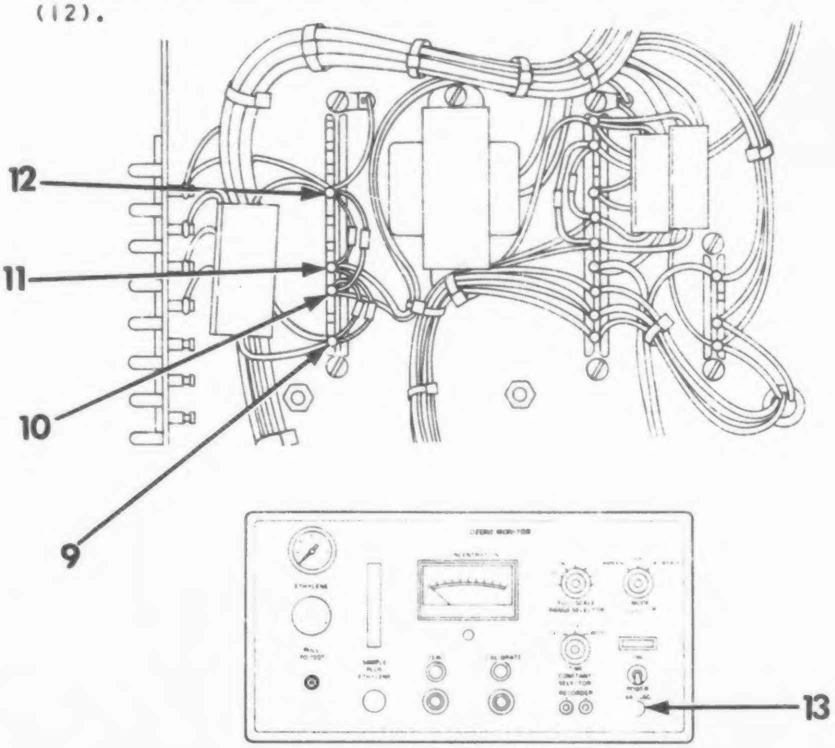
366. Repair or replace wiring and connectors as necessary. Go to step 371.

367. Reconnect disconnected wire.

368. Position monitor chassis in normal operating position.

369. Install new 4A-3AG fuse in fuseholder (13).

370. Go to step 1.



371. Position monitor chassis in normal operating position.

372. Install new 4A-3AG fuse in fuseholder (1).

373. Go to step 1.

374. Reinstall Alarm and Valve Control P.C. Board.

375. Position monitor chassis in normal operating position.

376. Install new 4A-3AG fuse in fuseholder (1).

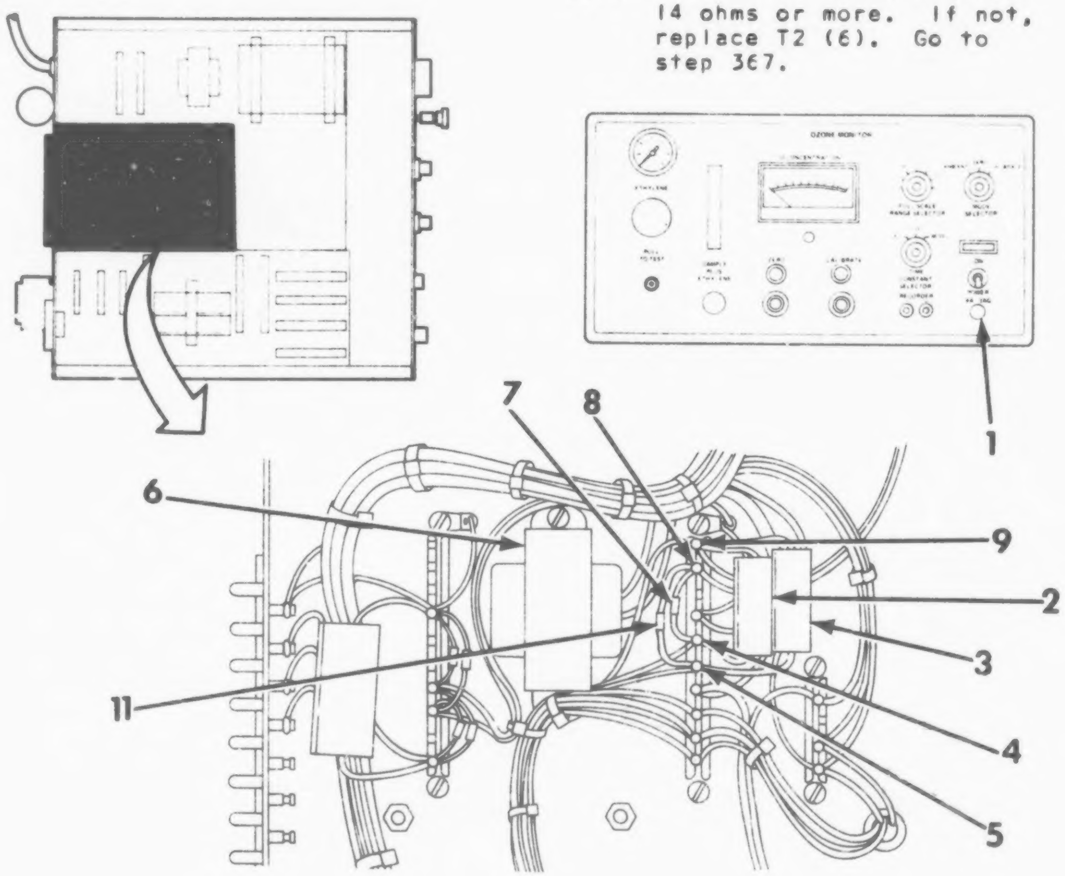
377. Go to step 1.

378. Remove 110 VDC Power supply P.C. Board (10).

379. Disconnect black wire from TP3-1 (9).

380. Use VOM to measure OHMS. Connect positive test lead to TP3-2 (8), common test lead to black wire (9).

381. Check that VOM indicates 14 ohms or more. If not, replace T2 (6). Go to step 367.



382. Disconnect diode lead (4) from TP3-5.

383. Use VOM to measure OHMS. Connect positive test lead to TP3-2 (8), common test lead to diode lead (4).

384. Check that VOM indicates 100K ohms or more. If not, replace CR2 (7). Go to step 367.

385. Use VOM to measure OHMS. Connect positive test lead to TP3-6 (5), common test lead to TP3-2 (8).

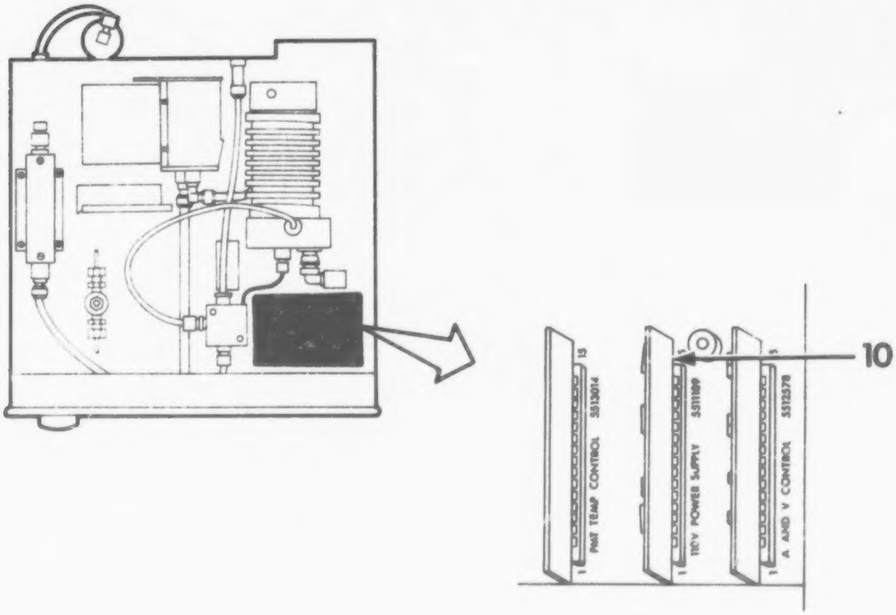
386. Check that VOM indicates 100K ohms or more. If not, replace CR1 (11). Go to step 367.

387. Use VOM to measure OHMS. Connect positive test lead to TP3-5 (4), common test lead to TP3-1 (9).

388. Check that VOM deflects sharply to 0, then increases to 100K ohms or more. If not, replace C6 (2), go to step 367.

389. Use VOM to measure OHMS. Connect positive test lead to TP3-6 (5), common test lead to TP3-1 (9).

390. Check that VOM deflects sharply to 0, then increases to 100K ohms or more. If not, replace C7 (3), go to step 367.



391. Reconnect black wire to TP3-2.

392. Reconnect diode lead to TP3-5.

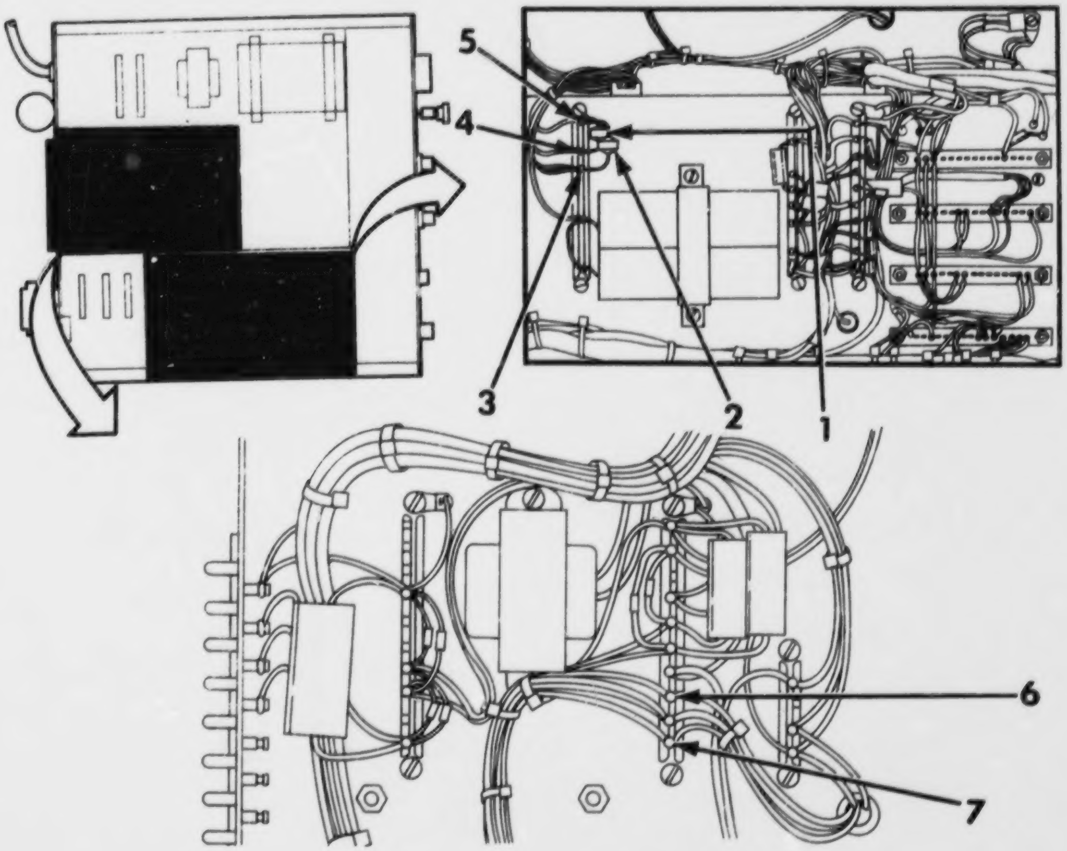
393. Use VOM to measure OHMS. Connect positive test lead to P.C. Board (11), common test lead to P.C. Board (9).

394. Check that VOM indicates 150K ohms or more. If not, replace 110 VDC Power Supply P.C. Board (8). Go to step 367.

395. Use VOM to measure OHMS. Connect positive test lead to P.C. Board (10), common test lead to P.C. Board (9).

396. Check that VOM indicates 150K ohms or more. If not, replace 110 VDC Power Supply P.C. Board (8). Go to step 367.

397. Repair or replace wiring and connectors as necessary. Go to step 371.



398. Disconnect green wire from TP3-8 (6).

399. Use VOM to measure OHMS. Connect positive test lead to TP3-10 (7), common test lead to green wire (6).

400. Check that VOM indicates 0.5 ohms or more. If not, replace T3 (12). Go to step 367.

401. Disconnect diode lead (4) from TP5-3.

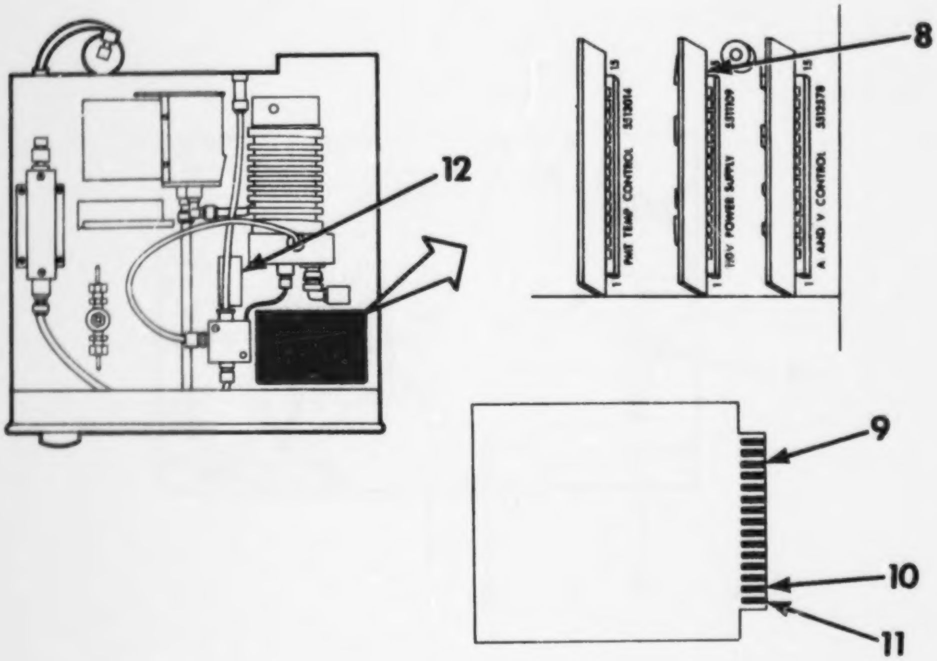
402. Use VOM to measure OHMS. Connect positive test lead to TP5-1 (5), common test lead to diode lead (4).

403. Check that VOM indicates 100K ohms or more. If not, replace CR3 (1). Go to step 367.

404. Disconnect diode lead (3) from TP5-4.

405. Use VOM to measure OHMS. Connect positive test lead to TP5-1 (5), common test lead to diode lead (3).

406. Check that VOM indicates 100K ohms or more. If not, replace CR4 (2). Go to step 367.


12
8
PMT TEMP CONTROL 5312014
HGV POWER SUPPLY 5311109
A AND V CONTROL 5312379
15
1
9
10
11

407. Reconnect diode leads to TP5.

408. Disconnect wire (3) from TP5-10.

409. Use VOM to measure OHMS. Connect positive test lead to TP6-7 (1), common test lead to TP5-10 (3).

410. Check that VOM deflects sharply to 0, then increases to 10K ohms or more. If not, replace C8 (2), go to step 367.

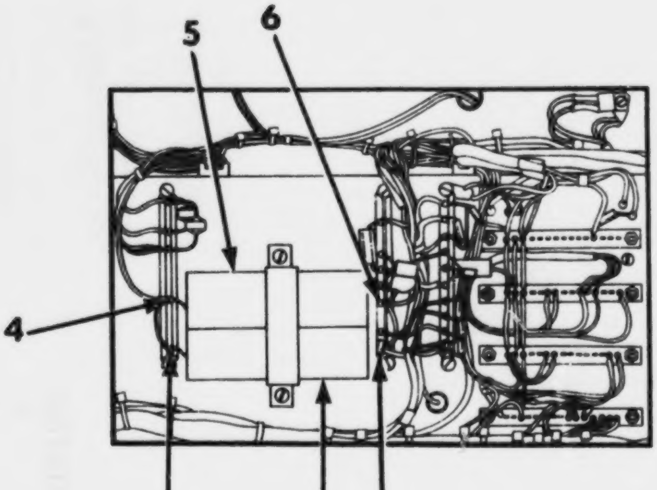
411. Use VOM to measure OHMS. Connect positive test lead to TP6-7 (6), common test lead to TP5-6 (4).

412. Check that VOM deflects sharply to 0, then increases to 10K ohms or more. If not, replace C9 (5), go to step 367.

413. Reconnect wire to TP5-10.

414. Reconnect green wire to TP3-8.

415. Repair or replace wiring and connectors as necessary. Go to step 371.



416. Disconnect red wire (11) from TP2-7.

417. Use VOM to measure OHMS. Connect positive test lead to red wire (11), common test lead to TP2-8 (10).

418. Check that VOM indicates 5 ohms or more. If not, replace T4 (14). Go to step 371.

419. Disconnect capacitor lead (9) from TP2-10.

420. Use VOM to measure OHMS. Connect positive test lead to TP2-10 (9), common test lead to TP2-7 (11).

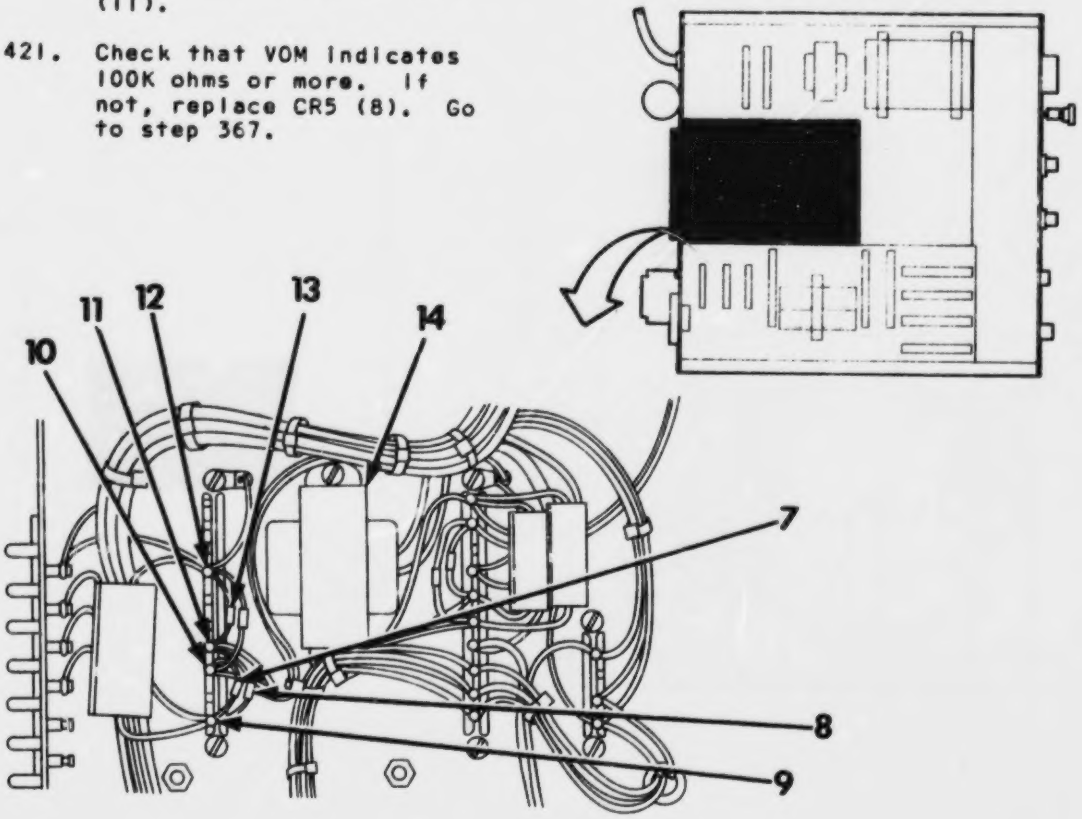
421. Check that VOM indicates 100K ohms or more. If not, replace CR5 (8). Go to step 367.

422. Use VOM to measure OHMS. Connect positive test lead to TP2-10 (9), common test lead to TP2-8 (10).

423. Check that VOM indicates 100K ohms or more. If not, replace CR6 (7). Go to step 367.

424. Use VOM to measure OHMS. Connect positive test lead to TP2-7 (11), common test lead to TP2-4 (12).

425. Check that VOM indicates 100K ohms or more. If not, replace CR7 (13). Go to step 367.



426. Use VOM to measure OHMS. Connect positive test lead to TP2-8 (7), common test lead to TP2-4 (9).

427. Check that VOM indicates 100K ohms or more. If not, replace CR8 (10). Go to step 367.

428. Use VOM to measure OHMS. Connect positive test lead to capacitor wire (6), common test lead to TP2-4 (9).

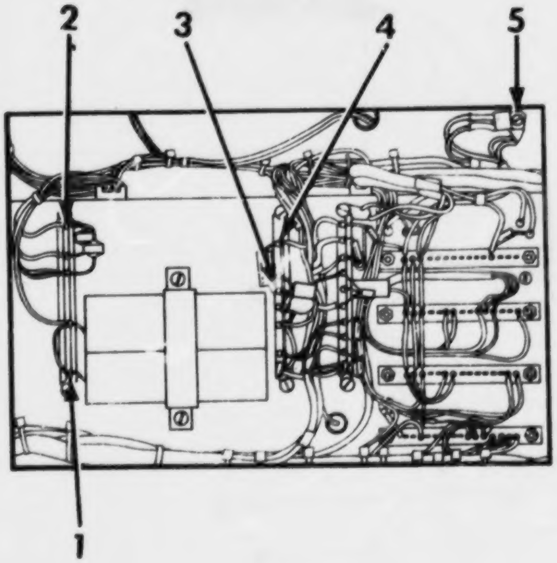
429. Check that VOM deflects sharply to 0, then increases to 100K ohms or more. If not, replace C10 (8), go to step 367.

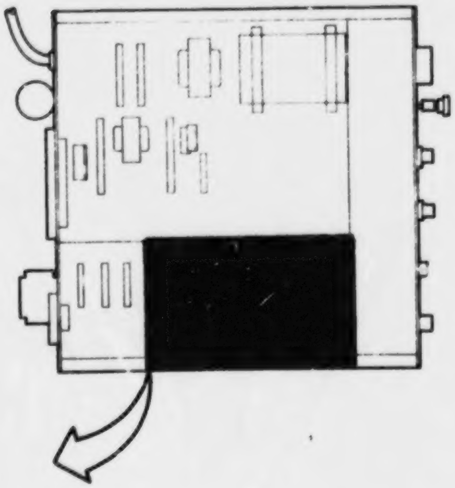
430. Reconnect wire to TP2-10.

431. Reconnect wire to TP2-7.

432. Repair or replace wiring and connectors as necessary. Go to step 371.

433. If you are servicing a mod A or B monitor, go to step 2533. If not, go to next step.





434. Check that voltage was low. If high, go to step 446.

435. Use VOM to measure VDC. Connect positive test lead to terminal (2), common test lead to terminal (1).

436. Check that VOM indicates 4 VDC or more. If not, go to step 455.

437. Use VOM to measure VDC. Connect positive test lead to terminal (3), common test lead to terminal (4).

438. Check that VOM indicates between .25 and 1.0 VDC. If not, go to step 473.

439. Set the POWER switch to OFF.

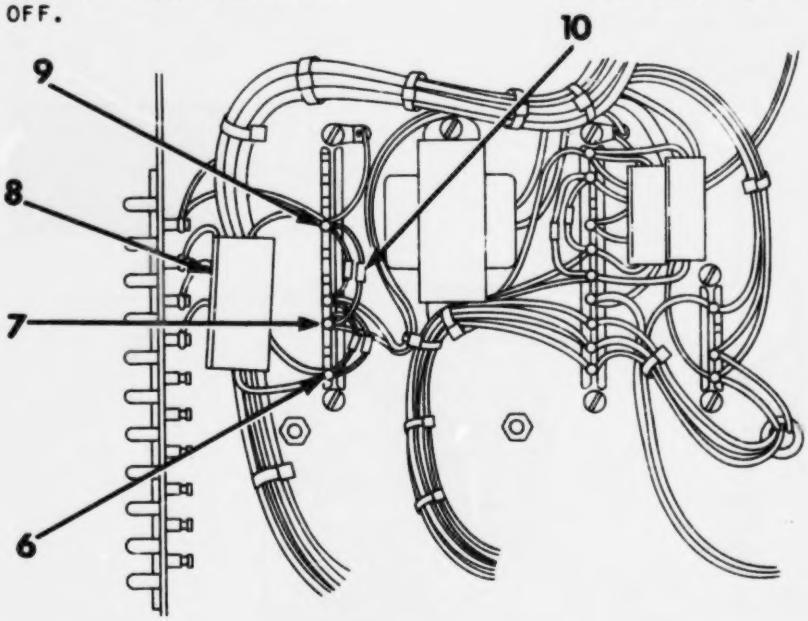
440. Disconnect AC power from monitor.

441. Use VOM to measure OHMS. Connect positive test lead to CR3 lead (2), common test lead to Q2 collector (5).

442. Check that VOM indicates between .75 and 1.25 ohms. If not, go to step 497.

443. Use VOM to measure OHMS. Connect positive test lead to Q2 Collector (5), common test lead to ground.

444. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 1.



445. Replace transistor Q2 (2). Go to step 1.

446. Use VOM to measure VDC. Connect positive test lead to terminal (3), common test lead to terminal (5).

447. Check that VOM indicates 2.0 VDC or less. If not, go to step 504.

448. Set the POWER switch to OFF.

449. Disconnect AC power from monitor.

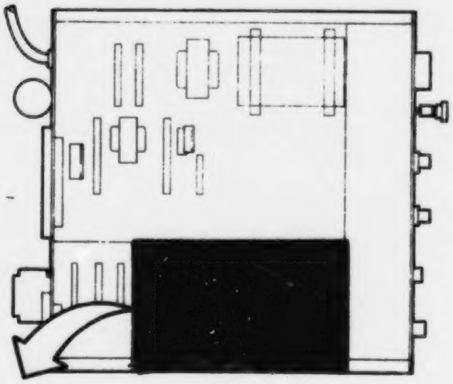
450. Use VOM to measure OHMS. Connect positive test lead to terminal (3), common test lead to terminal (5).

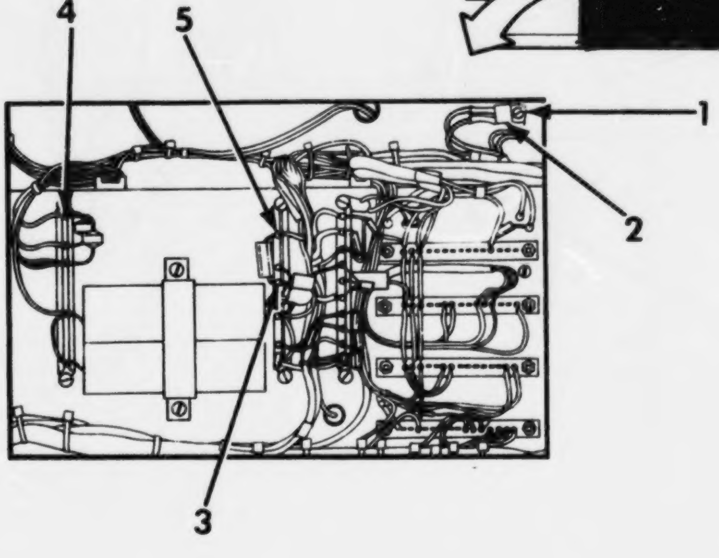
451. Check that VOM indicates 18 ohms or more. If not, go to step 511.

452. Use VOM to measure OHMS. Connect positive test lead to CR3 cathode (4), common test lead to Q2 collector (1).

453. Check that VOM indicates between .75 and 1.25 ohms. If not, go to step 517.

454. Replace transistor Q2 (2). Go to step 1.





455. Use VOM to measure VAC. Connect positive test lead to terminal (9), common test lead to terminal (6).

456. Check that VOM indicates 10 VAC or more. If not, go to step 582.

457. Set the POWER switch to OFF.

458. Disconnect AC power from monitor.

459. Disconnect wire (8) from terminal.

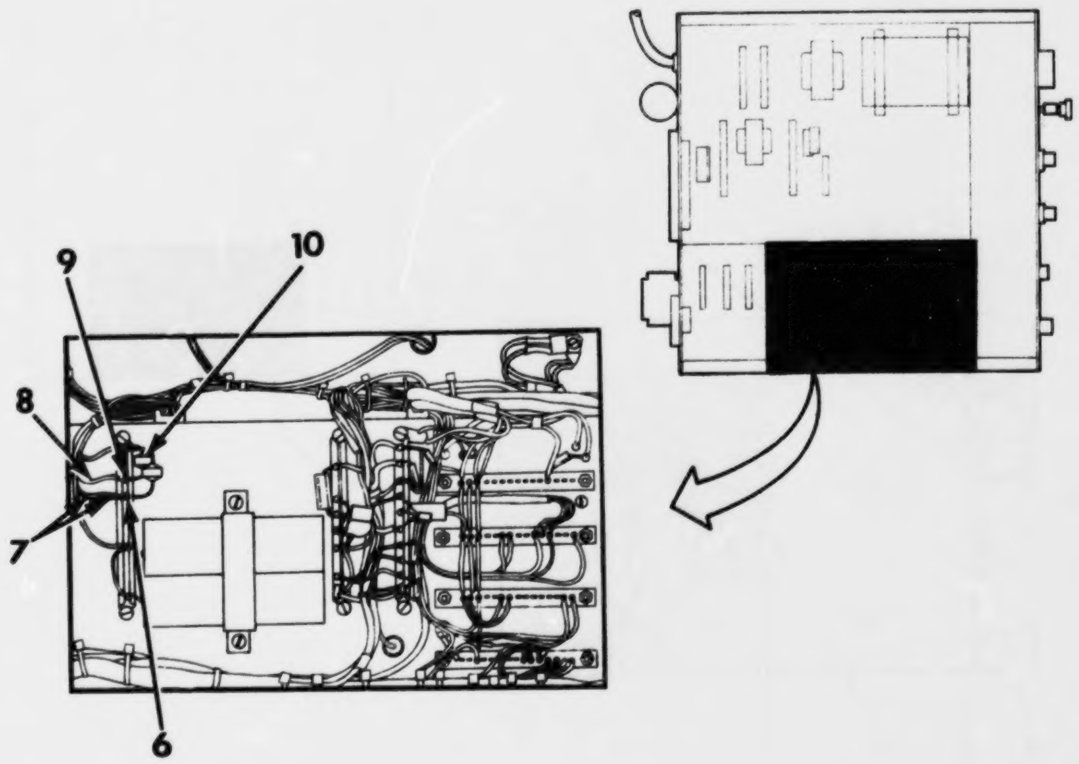
460. Disconnect two wires (7) from terminal.

461. Use VOM to measure OHMS. Connect positive test lead to CR3 anode (9), common test lead to CR3 cathode (4).

462. Check that VOM indicates 25 ohms or less. If not, replace diode CR3 (10). Go to step 526.

463. Use VOM to measure OHMS. Connect positive test lead to CR3 cathode (4), common test lead to CR3 anode (9).

464. Check that VOM indicates 100K ohms or more. If not, replace diode CR3 (10). Go to step 526.



465. Use VOM to measure OHMS. Connect positive test lead to CR4 anode (6), common test lead to CR4 cathode (7).

466. Check that VOM indicates 25 ohms or less. If not, replace diode CR4 (8). Go to step 526.

467. Use VOM to measure OHMS. Connect positive test lead to CR4 cathode (7), common test lead to CR4 anode (6).

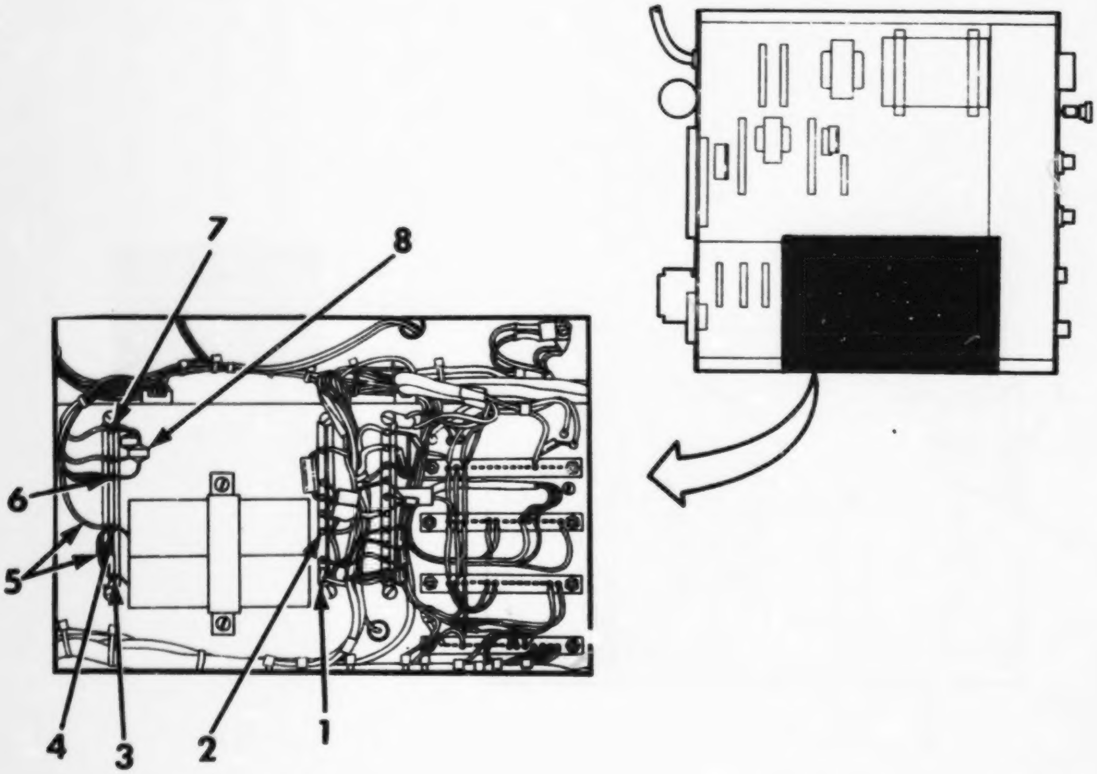
468. Check that VOM indicates 100K ohms or more. If not, replace diode CR4 (8). Go to step 526.

469. Disconnect two wires (5) from terminal.

NOTE

In the next steps VOM indication must be observed, the instant VOM test leads are connected.

470. Use VOM to measure OHMS. Connect positive test lead to terminal (2), common test lead to terminal (4) and check that VOM indication initially deflects to 50 ohms or less then increases to 100K ohms or more. If not, go to step 523.



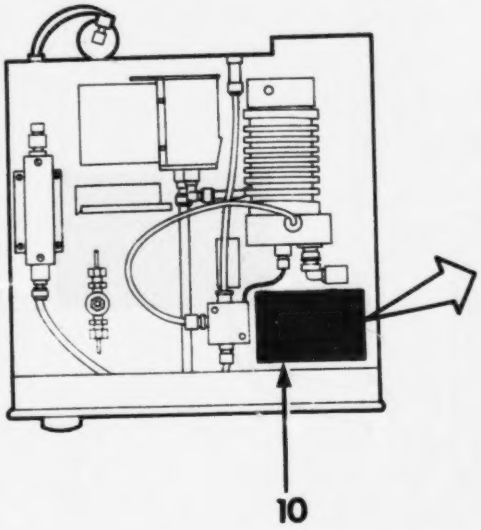
NOTE

In the next steps VOM indication must be observed, the instant VOM test leads are connected.

471. Use VOM to measure OHMS. Connect positive test lead to terminal (1), common test lead to terminal (3) and check that VOM indication initially deflects to 50 ohms or less then increases to 100K ohms or more. If not, go to step 524.

472. Repair or replace wiring and connectors as necessary. Go to step 525.

473. Remove cover (10).

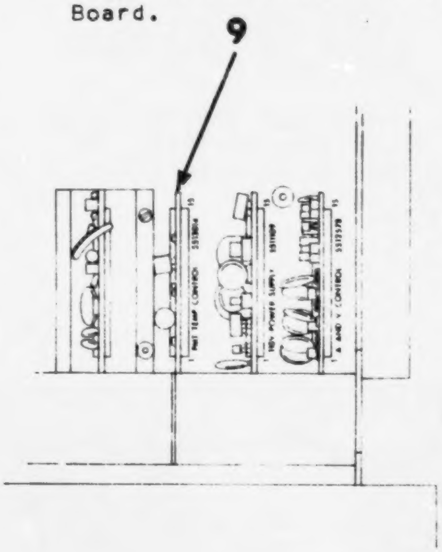


474. Interchange Photomultiplier Temperature Control PC Board (9) with a new one.

NOTE

To determine if card substitution cleared malfunction, perform checkout beginning with step 16 and continuing through step 22. If malfunction symptom still persists, go to step 475. If malfunction is cleared, continue with checkout.

475. Remove Photomultiplier Temperature Control P.C. Board.



476. Use VOM to measure VAC. Connect positive test lead to J2 pin 1 (1), common test lead to J2 pin 4 (2).

477. Check that VOM indicates 6 VAC or more. If not, repair or replace wiring and connectors as necessary; go to step 565.

478. Set the POWER switch to OFF.

479. Disconnect AC power from monitor.

480. Use VOM to measure OHMS. Connect positive test lead to J2 pin 4 (2), common test lead to J2 pin 5 (3).

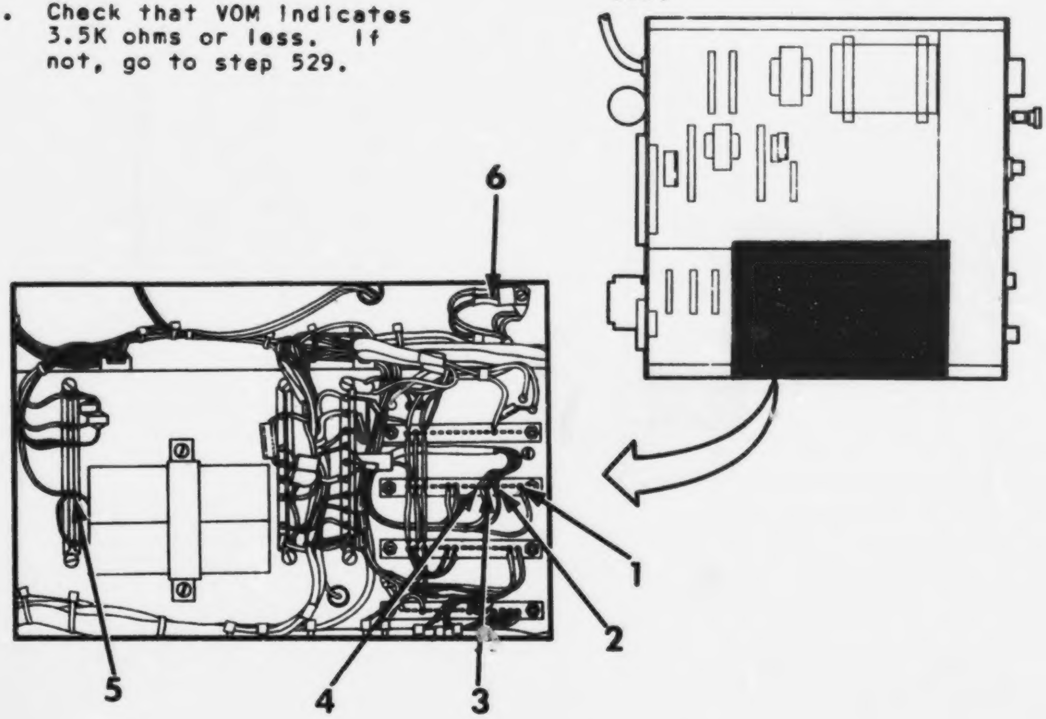
481. Check that VOM indicates 3.5K ohms or less. If not, go to step 529.

482. Use VOM to measure OHMS. Connect positive test lead to J2 pin 6 (4), common test lead to ground.

483. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 565.

484. Use VOM to measure OHMS. Connect positive test lead to Q2 emitter (6), common test lead to terminal (5).

485. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 565.



486. Use VOM to measure OHMS. Connect positive test lead to Q2 base (10), common test lead to terminal (9).

487. Check that VOM indicates 25 ohms or less. If not, go to step 535.

488. Use VOM to measure OHMS. Connect positive test lead to Q2 base (10), common test lead to Q2 emitter (6).

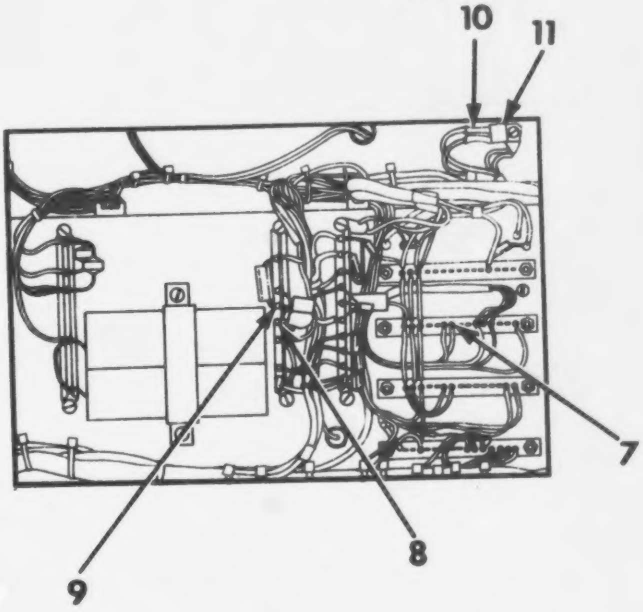
489. Check that VOM indicates IK ohms or less. If not, replace transistor Q2 (11). Go to step 565.

490. Use VOM to measure OHMS. Connect positive test lead to J2 pin 4 (2), common test lead to Q3 collector (9).

491. Check that VOM indicates I ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 565.

492. Use VOM to measure OHMS. Connect positive test lead to J2 pin 9 (7), common test lead to Q3 base (8).

493. Check that VOM indicates I ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 565.

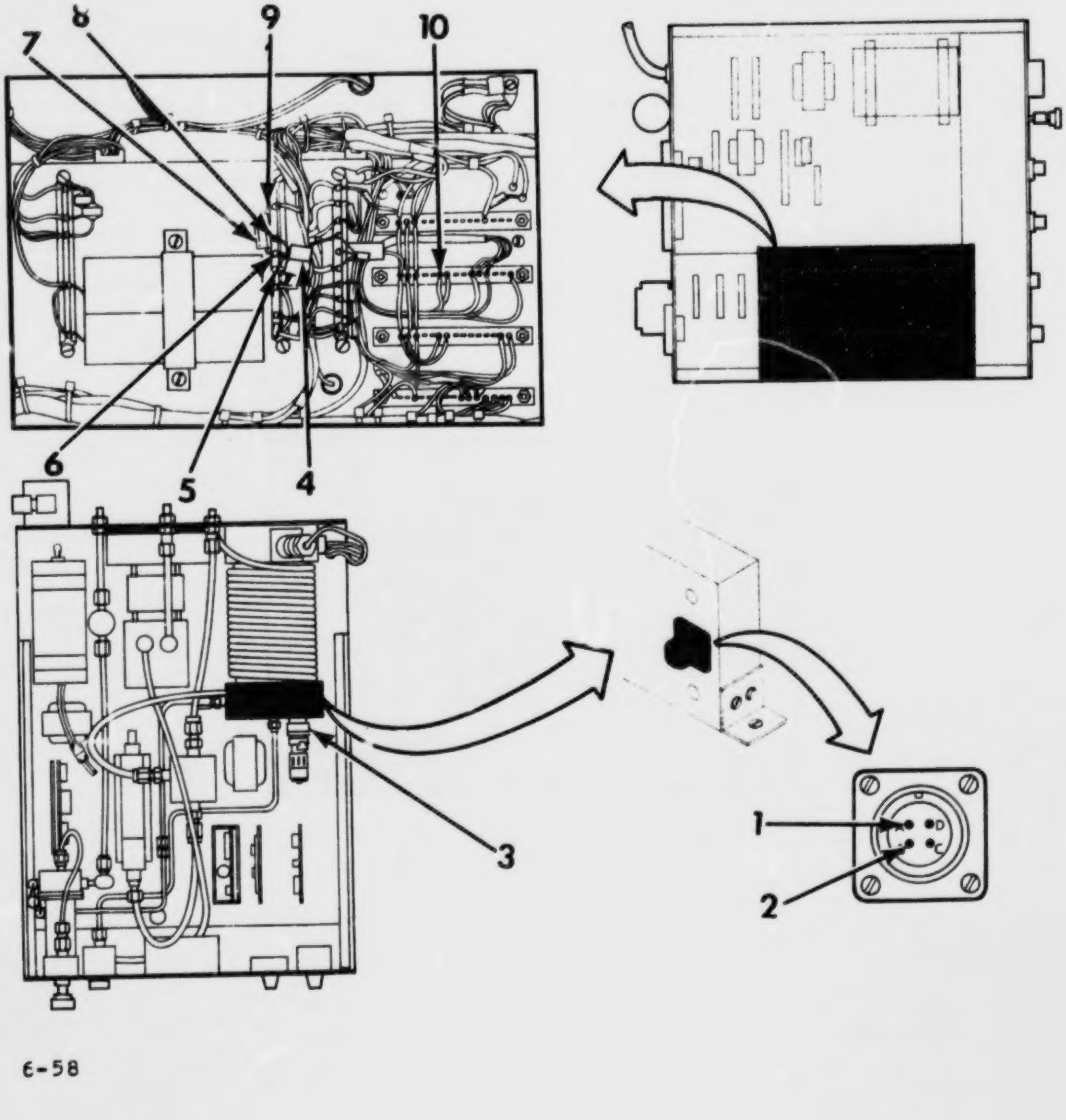


494. Use VOM to measure OHMS. Connect positive test lead to J2 pin 10 (10), common test lead to Q3 emitter (8).

495. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 565.

496. Replace transistor Q3 (4). Go to step 565.

497. Disconnect P8 (3) from detector cell.



498. Use VOM to measure OHMS. Connect positive test lead to J8 pin A (1), common test lead to J8 pin B (2).

499. Check that VOM indicates between 1.0 and 2.0 ohms. If not, go to step 503.

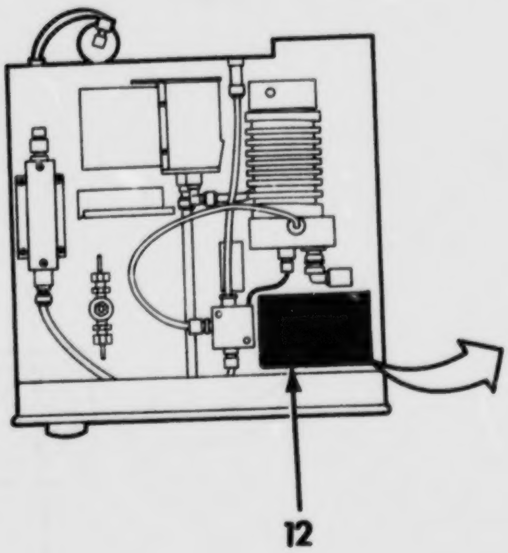
500. Repair or replace wiring and connectors as necessary.

501. Reconnect P8 to detector cell.

502. Go to step 1.

503. Next, Replace Detector Cell Assembly procedure begins at page 7-21. Go on to Step 1 when finished.

504. Use VOM to measure VDC. Connect positive test lead to terminal (8), common test lead to terminal (5).



505. Check that VOM indicates .7 VDC or less. If not, go to step 538.

506. Set the POWER switch to OFF.

507. Disconnect AC power from monitor.

508. Remove cover (12).

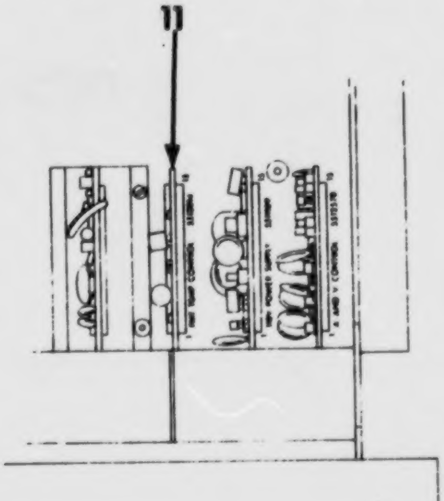
509. Remove Photomultiplier Temperature Control P.C. Board (11).

510. Go to step 554.

511. Disconnect R19 lead (9) from terminal.

512. Use VOM to measure OHMS. Connect positive test lead to R19 lead (9), common test lead to terminal (6).

513. Check that VOM indicates 18 ohms or more. If not, replace resistor R19 (7). Go to step 1.



514. Repair or replace wiring and connectors as necessary.

515. Reconnect R19 lead to terminal.

516. Go to step 1.

517. Disconnect P8 (3) from Detector Cell.

518. Use VOM to measure OHMS. Connect positive test lead to J8 pin A (2), common test lead to J8 pin B (1).

519. Check that VOM indicates between 1 and 2 ohms. If not, go to step 503.

520. Repair or replace wiring and connectors as necessary.

521. Reconnect P8 to detector cell.

522. Go to step 1.

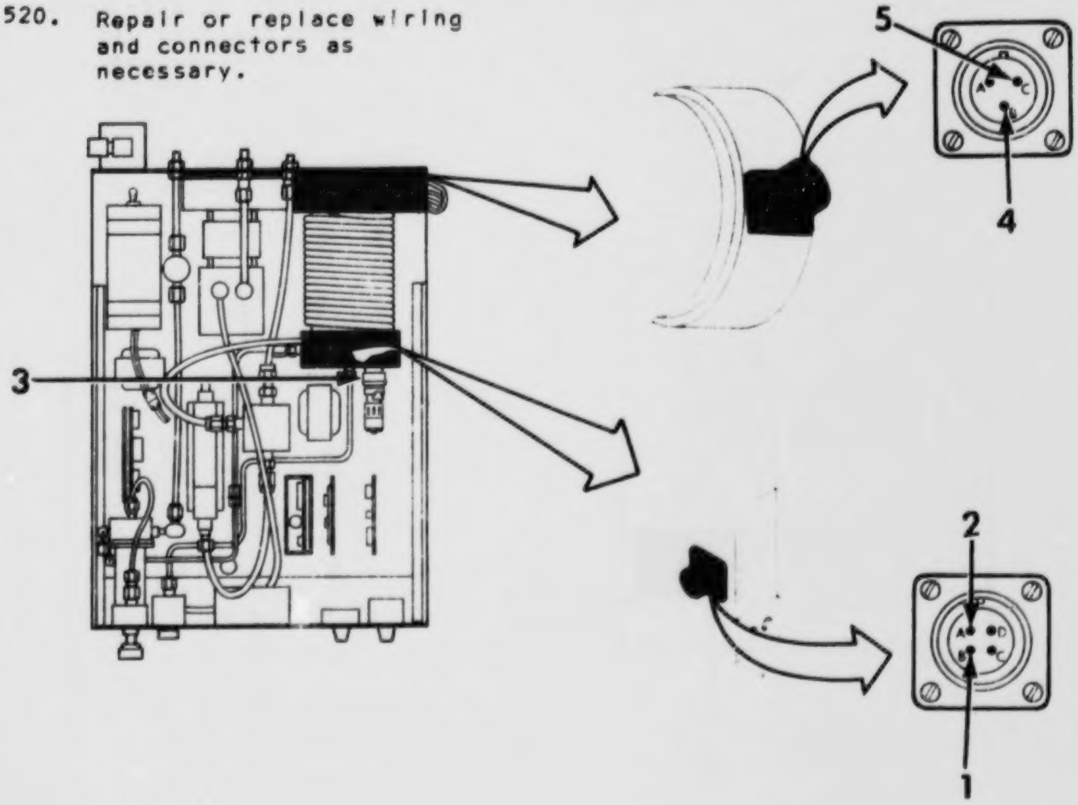
523. Replace capacitor C8 (12). Go to step 525.

524. Replace capacitor C9 (8).

525. Reconnect two wires to terminal (9).

526. Reconnect wire to terminal (11).

527. Reconnect two wire to terminal (10).



528. Go to step 1.

529. Disconnect P6 (6) from detector cell.

530. Use VOM to measure OHMS. Connect positive test lead to J6 pin B (4), common test lead to J6 pin C (5).

531. Check that VOM indicates 3.5K ohms or less. If not, go to step 564.

532. Repair or replace wiring and connectors as necessary.

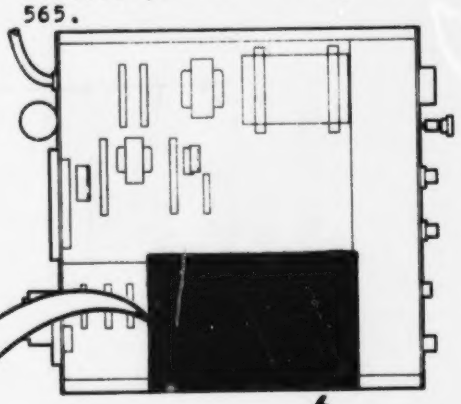
533. Reconnect P6 to detector cell.

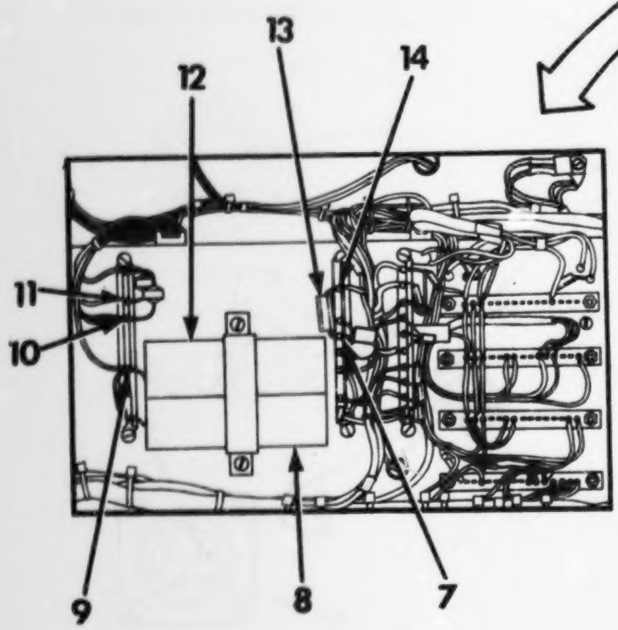
534. Go to step 565.

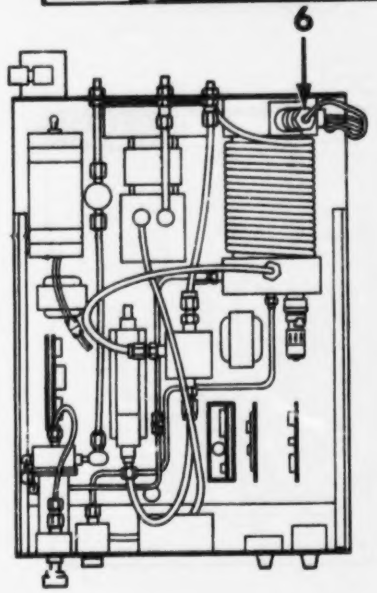
535. Use VOM to measure OHMS. Connect positive test lead to terminal (7), common test lead to terminal (14).

536. Check that VOM indicates 25 ohms or less. If not, replace resistor R19 (13). Go to step 565.

537. Repair or replace wiring and connectors as necessary. Go to step 565.







538. Set the POWER switch to OFF.

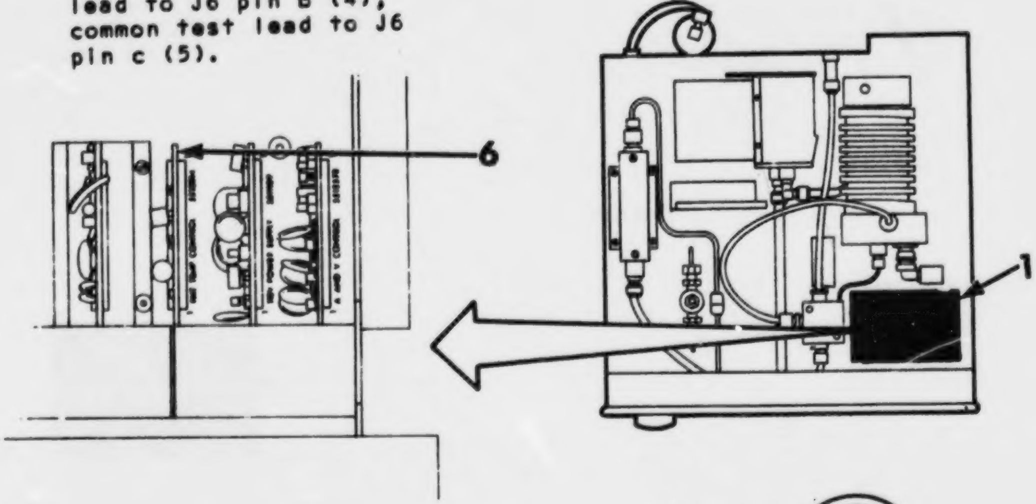
539. Disconnect AC power from monitor.

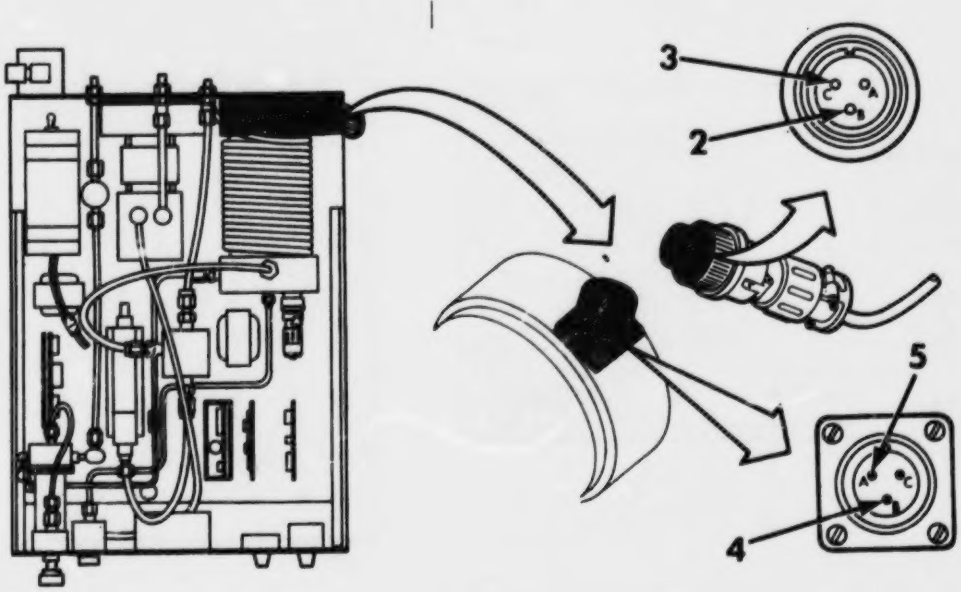
540. Disconnect P6 (9) from detector cell.

541. Use VOM to measure OHMS. Connect positive test lead to J6 pin B (4), common test lead to J6 pin c (5).

542. Check that VOM indicates 1.8K ohms or more. If not, go to step 503.

543. Remove cover (1).





544. Remove Photomultiplier Temperature Control P.C. Board (6).

545. Use VOM to measure OHMS. Connect positive test lead to P6 pin B (2), common test lead to P4 pin 4 (7).

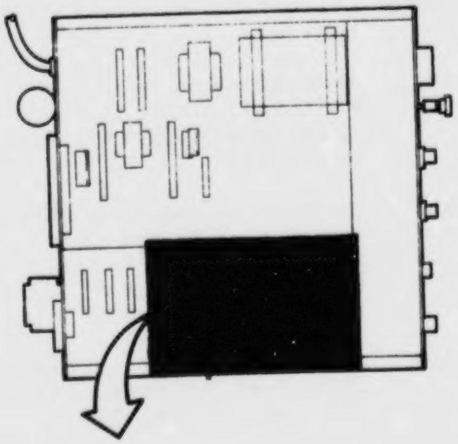
546. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 567.

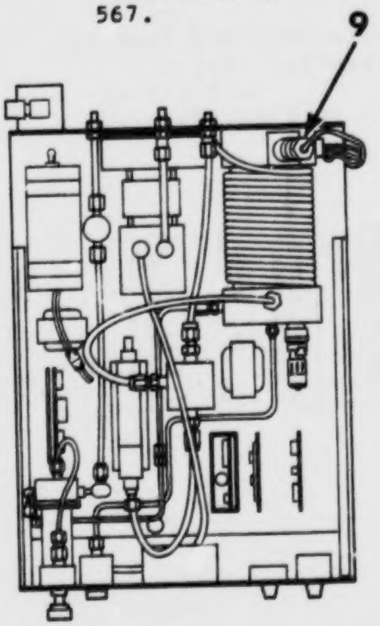
547. Use VOM to measure OHMS. Connect positive test lead to P6 pin C (3), common test lead to J4 pin 5 (8).

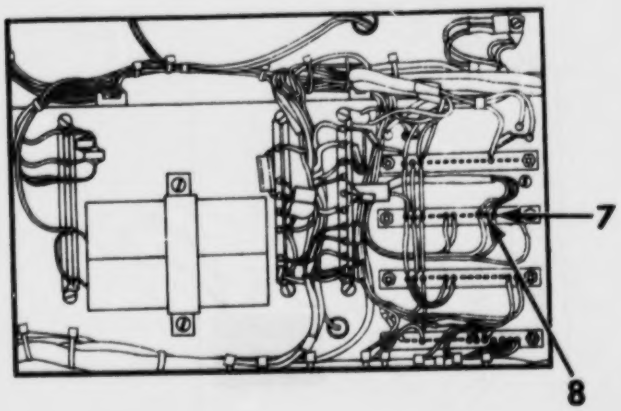
548. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 567.

549. Reconnect P6 to detector cell.

550. Install new Photomultiplier Temperature Control PC Board.







NOTE

To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 22. If malfunction symptom still persists, go to step 551. If malfunction is cleared, continue with checkout.

551. Set the POWER switch to OFF.

552. Disconnect AC power from monitor.

553. Remove new Photomultiplier Temperature Control P.C. Board (1).

554. Use VOM to measure OHMS. Connect positive test lead to J2 pin 9 (2), common test lead to J2 pin 10 (3).

555. Check that VOM indicates 500K ohms or more. If not, go to step 570.

556. Use VOM to measure OHMS. Connect positive test lead to terminal (10), common test lead to terminal (7).

557. Check that VOM indicates 100K ohms or more. If not, replace transistor Q3 (12). Go to step 580.

558. Disconnect R19 lead (8) from terminal.

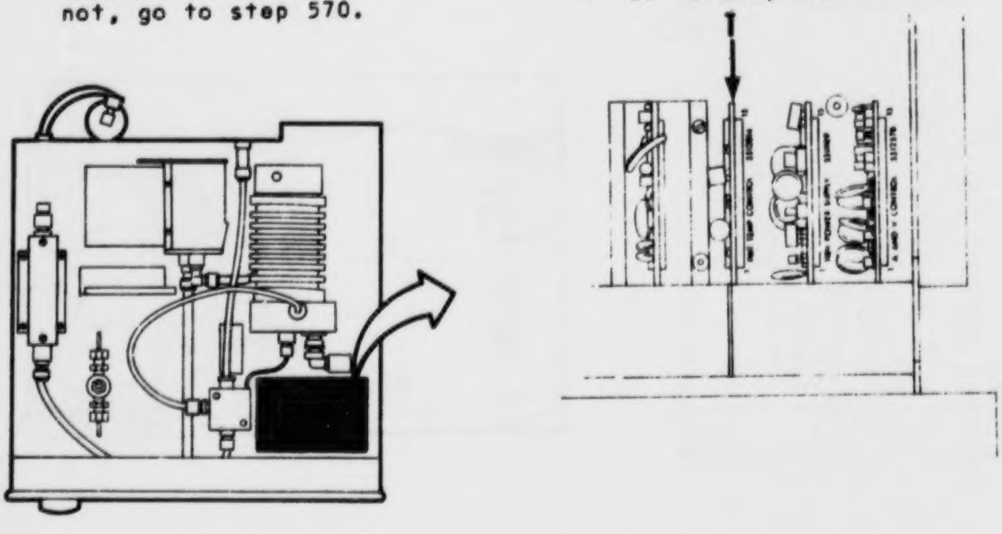
559. Use VOM to measure OHMS. Connect positive test lead to R19 lead (8), common test lead to terminal (7).

560. Check that VOM indicates 18 ohms or more. If not, replace resistor R19 (6). Go to step 580.

561. Repair or replace wiring and connectors as necessary.

562. Reconnect R19 lead to terminal (9).

563. Go to step 580.



564. Next, Replace Detector Cell Assembly procedure begins at page 7-21. Go on to step 565 when finished.

565. Reinstall Photomultiplier Temperature Control P.C. Board.

566. Go to step 1.

567. Reconnect P6 to detector cell.

568. Reinstall Photomultiplier Temperature Control P.C. Board.

569. Go to step 1.

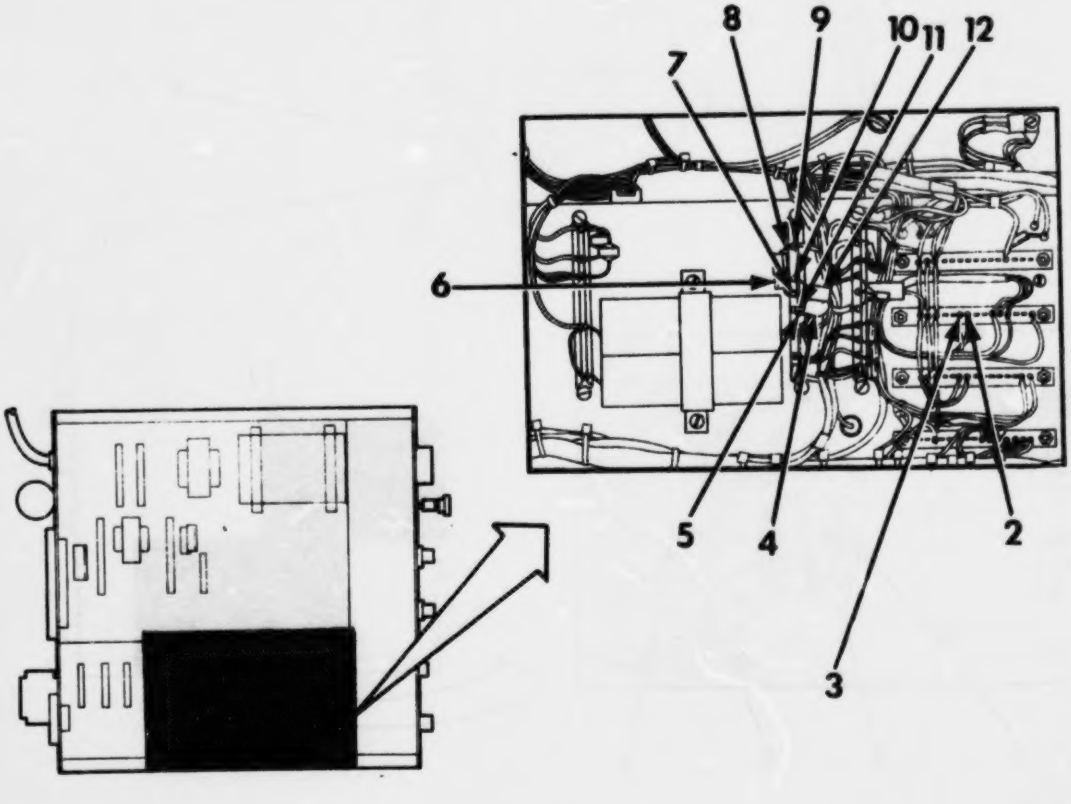
570. Disconnect C5 lead (5) from terminal.

571. Use VOM to measure OHMS. Connect positive test lead to J2 pin 9 (2), common test lead to J2 pin 10 (3).

572. Check that VOM indicates 500K ohms or more. If not, go to step 574.

573. Replace capacitor C5 (4). Go to step 580.

574. Disconnect wire (11) from terminal.



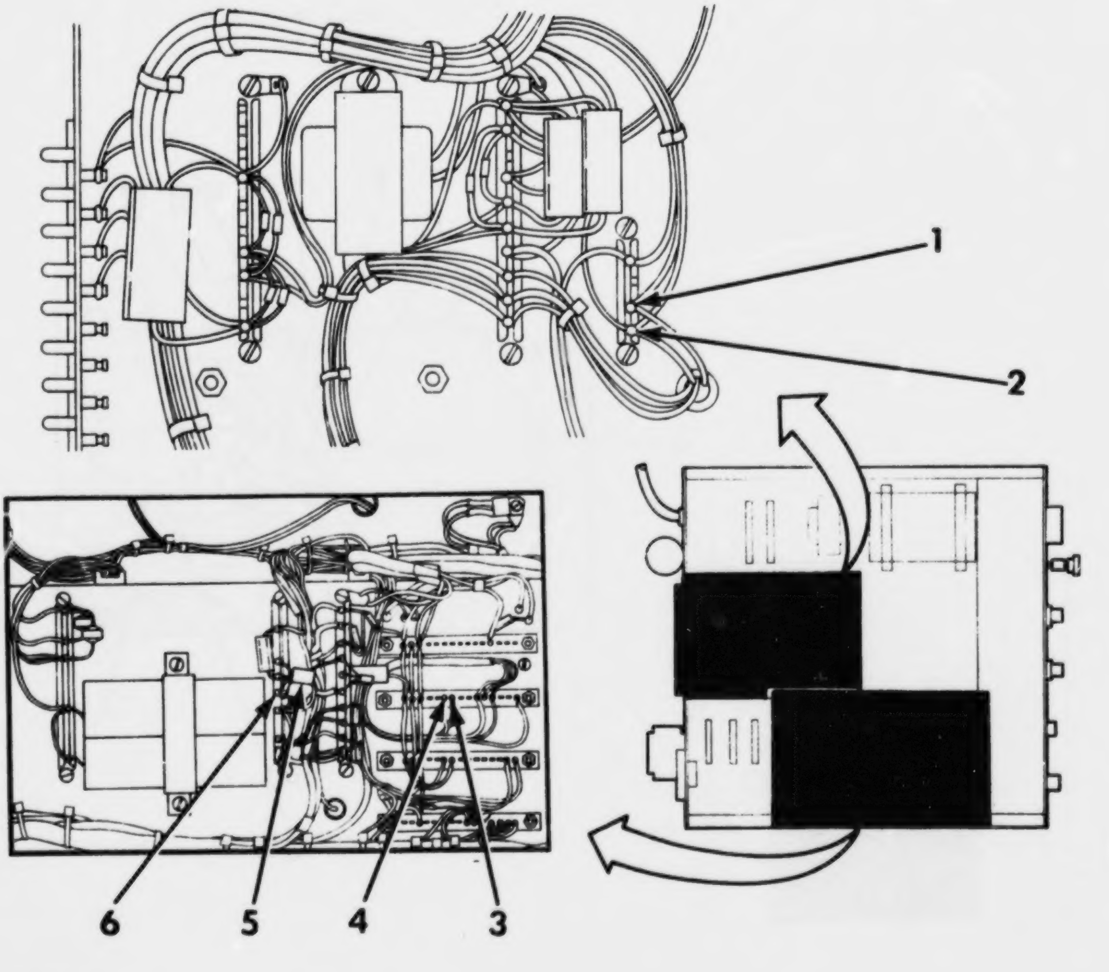
575. Use VOM to measure OHMS. Connect positive test lead to J2 pin 9 (3), common test lead to J2 pin 10 (4).

576. Check that VOM indicates 500K ohms or more. If not, repair or replace wiring and connectors as necessary; go to step 578.

577. Replace transistor Q3 (5).

578. Reconnect wire to terminal (6).

579. Reconnect C5 lead to terminal (6).



580. Reinstall Photomultiplier Temperature Control P.C. Board.

581. Go to step 1.

582. Use VOM to measure VAC. Connect positive test lead to terminal (1), common test lead to terminal (2).

583. Check that VOM indicates 100 VAC or more. If not, repair or replace wiring and connectors as necessary; go to step 1.

584. Replace transformer T3 (7). Go to step 1.

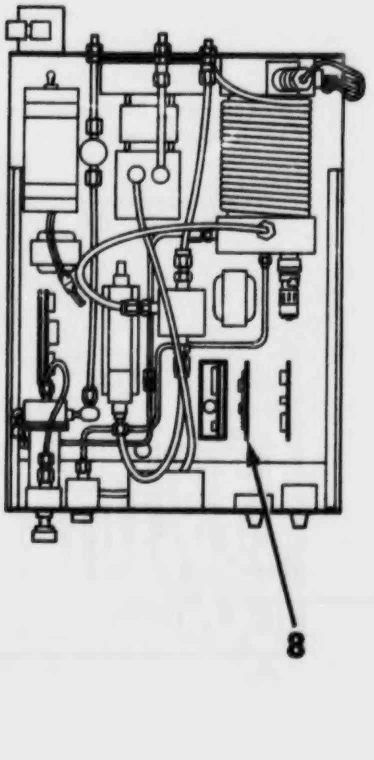
585. If you are servicing a MOD-C monitor, go to step 610. If not, go to next step.

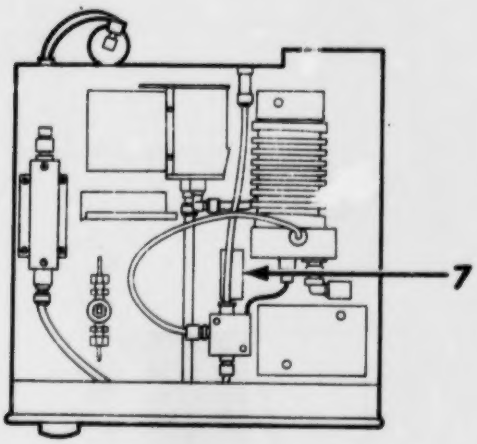
586. Check that VOM indication decreased within 15 minutes. If not, go to step 592.

587. Interchange Photomultiplier Temperature Control PC Board (8) with a new one.

NOTE

To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 23. If malfunction symptom still persists, go to step 588. If malfunction is cleared, continue with checkout.





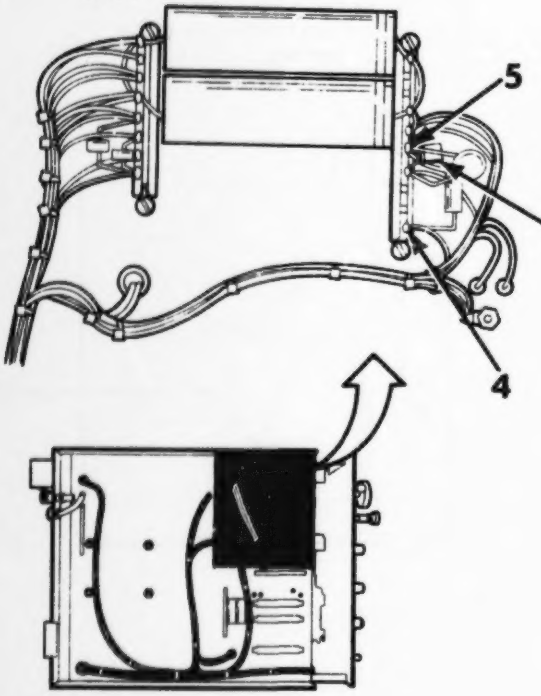
588. Remove new Photomultiplier Temperature Control PC Board (10) from monitor, reinstall old PC Board.

589. Use VOM to measure VDC. Connect positive test lead to terminal (5), common test lead to terminal (4).

590. Check that VOM indicates 1.5 VDC or less. If not, go to step 597.

591. Replace transistor Q2 (2). Go to step 1.

592. Interchange Photomultiplier Temperature Control PC Board (10) with a new one.



NOTE

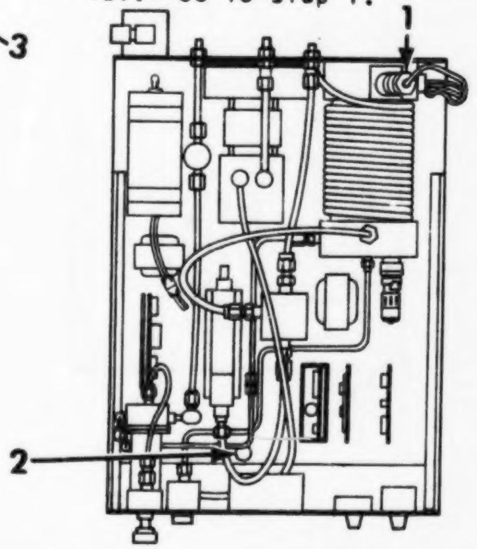
To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 23. If malfunction symptom still persists, go to step 593. If malfunction is cleared, continue with checkout.

593. Remove new Photomultiplier Temperature Control PC Board (10) from monitor, reinstall old PC Board.

594. Use VOM to measure VDC. Connect positive test lead to terminal (5), common test lead to terminal (4).

595. Check that VOM indicates 1.5 VDC or less. If not, go to step 600.

596. Replace transistor Q2 (2). Go to step 1.



597. Use VOM to measure VDC. Connect positive test lead to J2 pin 4 (9), common test lead to J2 pin 5 (8).

598. Check that VOM indicates 2.2 VDC or more. If not, replace transistor Q3 (3). Go to step 1.

599. Next, Replace Detector Cell Assembly, procedure begins at page 7-21. Go on to step 1 when finished.

NOTE

Step 601 must be performed within 30 seconds after disconnecting P6.

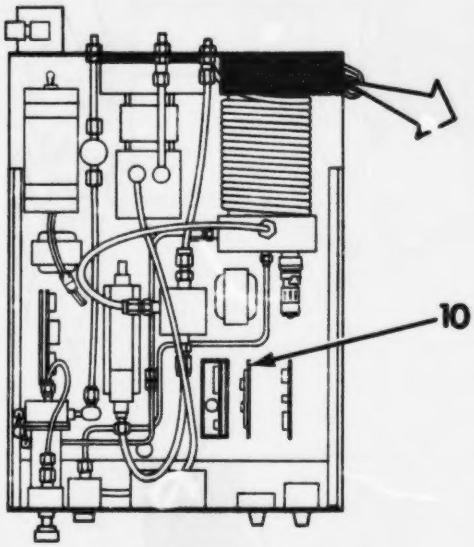
600. Disconnect P6 (5) from detector cell.

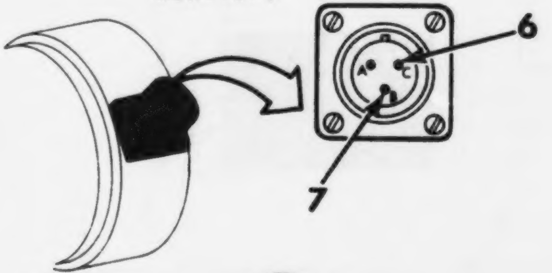
601. Use VOM to measure OHMS. Connect positive test lead to J6 pin B (4), common test lead to J6 pin C (3).

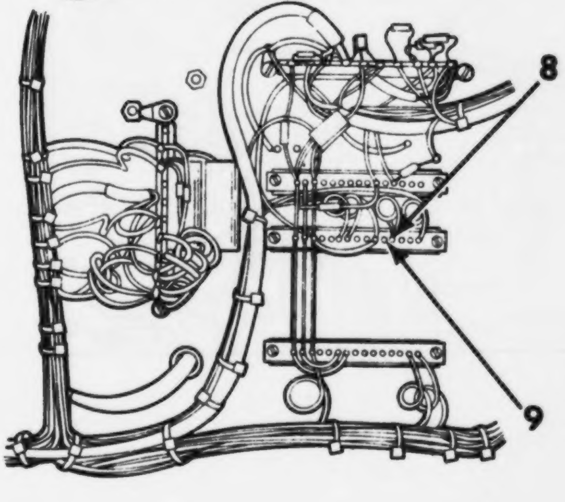
602. Check that VOM indicates 4K ohms or more. If not, go to step 609.

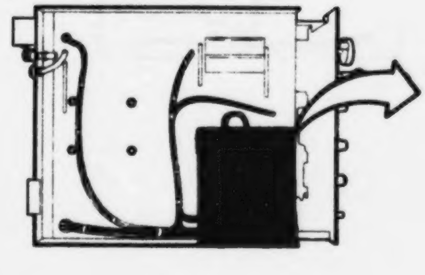
603. Set the POWER switch to OFF.

604. Disconnect AC power from monitor.









605. Reconnect P6 to detector cell.

606. Use VOM to measure OHMS. Connect positive test lead to terminal (3), common test lead to terminal (2).

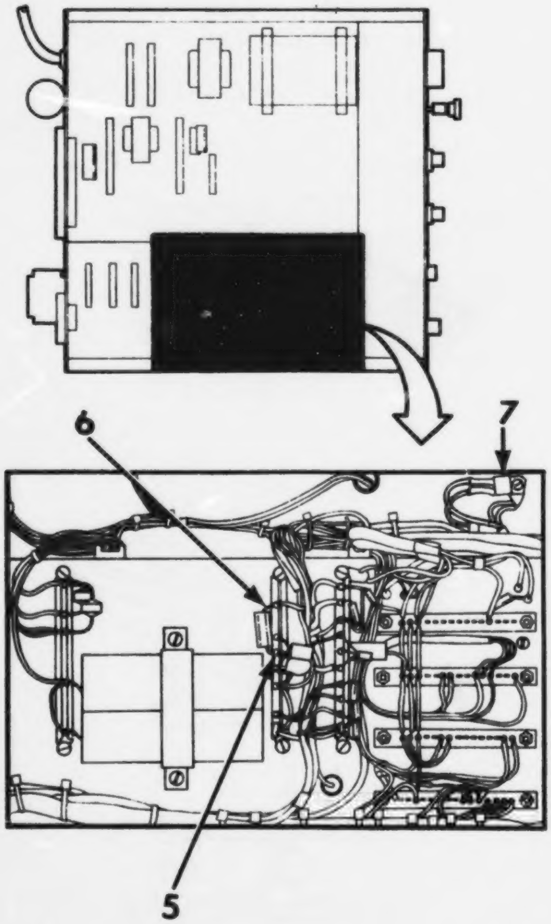
607. Check that VOM indicates between 18 and 26 ohms. If not, replace resistor R19 (1). Go to step 1.

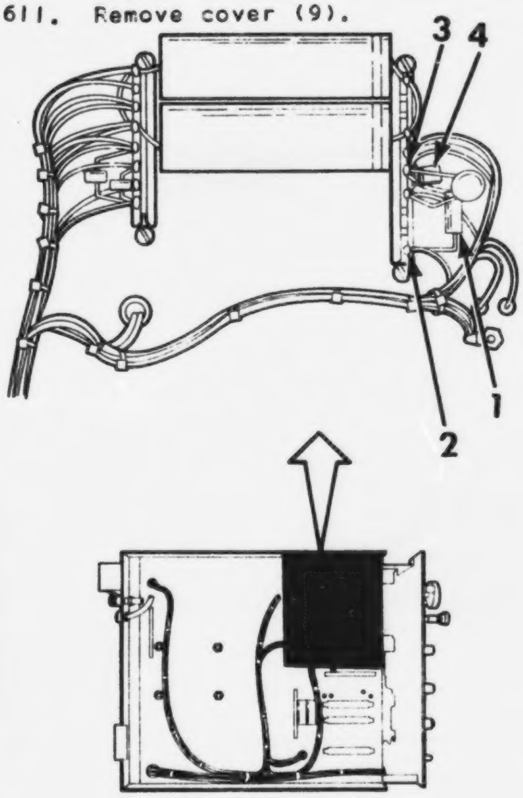
608. Replace transistor Q3 (4). Go to step 1.

609. Next, Replace Detector Cell Assembly, procedure begins at page 7-21. Go on to step 1 when finished.

610. Check that VOM indication decreased within 15 minutes. If not, go to step 618.

611. Remove cover (9).





612. Interchange Photomultiplier Temperature Control PC Board (8) with a new one.

NOTE

To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 23. If malfunction symptom still persists, go to step 613. If malfunction is cleared, continue with checkout.

613. Remove new Photomultiplier Temperature Control PC Board (8) from monitor, reinstall old PC Board.

614. Reinstall cover.

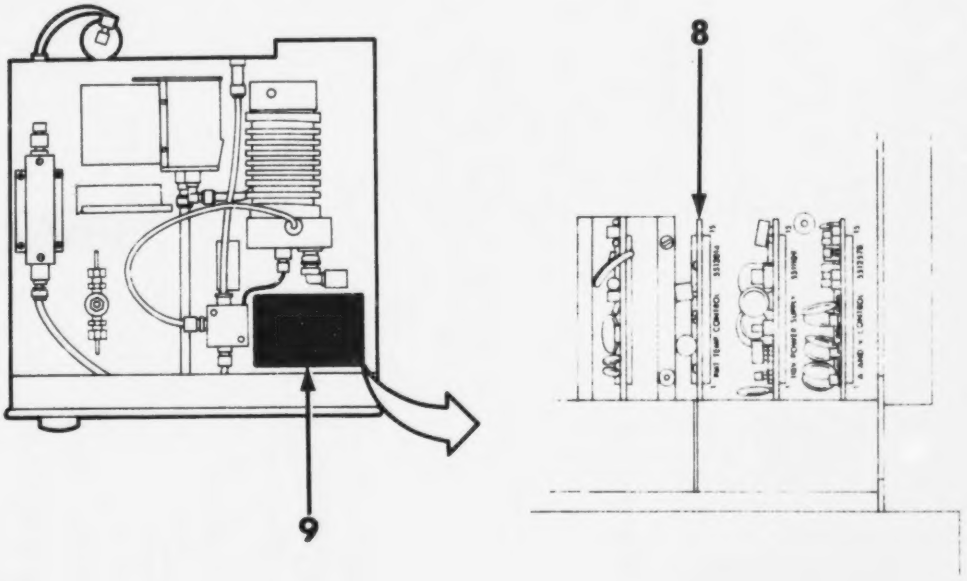
615. Use VOM to measure VDC. Connect positive test lead to terminal (6), common test lead to terminal (5).

616. Check that VOM indicates 1.5 VDC or less. If not, go to step 625.

617. Replace transistor Q2 (7). Go to step 1.

618. Remove cover (9).

619. Interchange Photomultiplier Temperature Control PC Board (8) with a new one.



NOTE

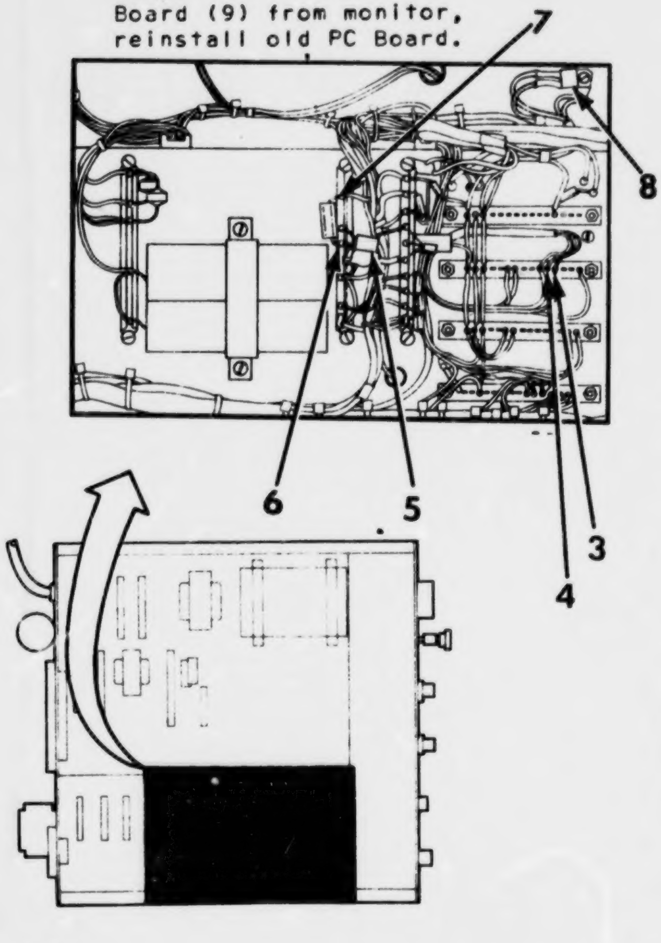
To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 23. If malfunction symptom still persists, go to step 620. If malfunction is cleared, continue with checkout.

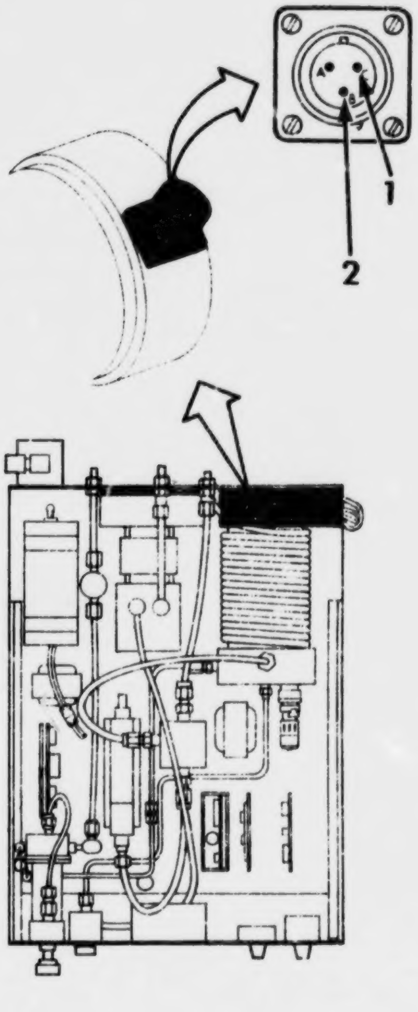
620. Remove new Photomultiplier Temperature Control PC Board (9) from monitor, reinstall old PC Board.

621. Reinstall cover.

622. Use VOM to measure VDC. Connect positive test lead to terminal (7), common test lead to terminal (6).

623. Check that VOM indicates 1.5 VDC or less. If not, go to step 628.





624. Replace transistor Q2 (8). Go to step 1.

625. Use VOM to measure VDC. Connect positive test lead to J2 pin 4 (3), common test lead to J2 pin 5 (4).

626. Check that VOM indicates 2.2 VDC or more. If not, replace transistor Q3 (5). Go to step 1.

627. Next, Replace Detector Cell Assembly, procedure begins at page 7-21. Go on to step 1 when finished.

NOTE

Step 629 must be performed within 30 seconds after disconnecting P6.

628. Disconnect P6 (10) from detector cell.

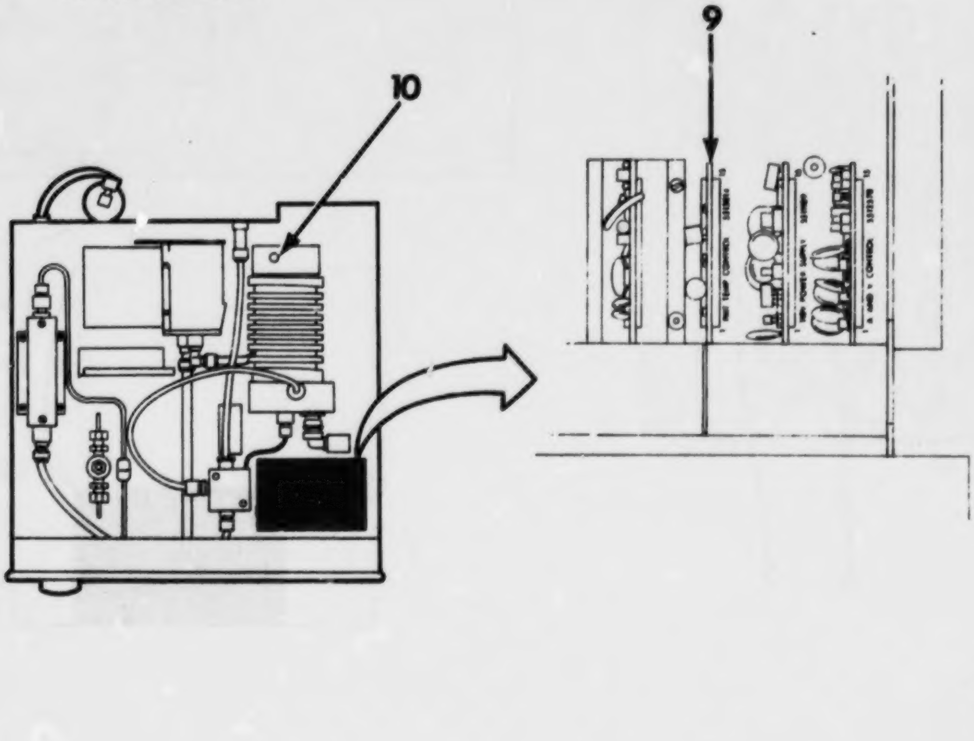
629. Use VOM to measure OHMS. Connect positive test lead to J6 pin B (2), common test lead to J6 pin C (1).

630. Check that VOM indicates 4K ohms or more. If not, go to step 637.

631. Set the POWER switch to OFF.

632. Disconnect AC power from monitor.

633. Reconnect P6 to detector cell.



634. Use VOM to measure OHMS. Connect positive test lead to terminal (4), common test lead to terminal (2).

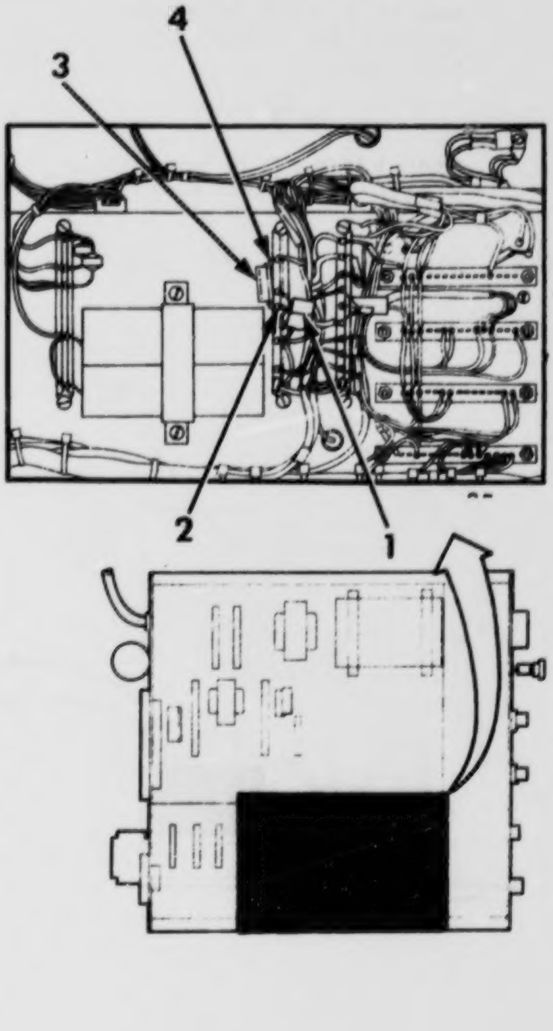
635. Check that VOM indicates between 18 and 26 ohms. If not, replace Resistor R19 (3). Go to step 1.

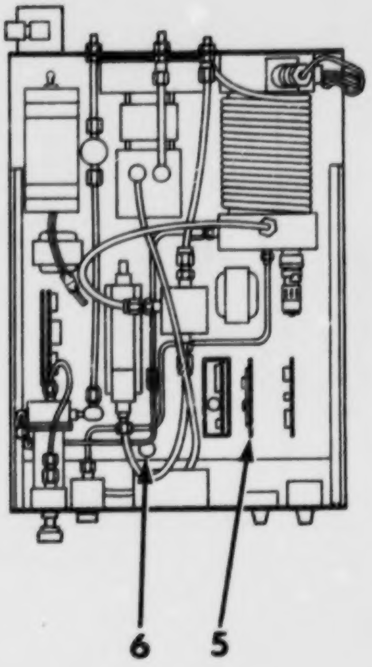
636. Replace transistor Q3 (1). Go to step 1.

637. Next, Replace Detector Cell Assembly, procedure begins at page 7-21. Go on to step 1 when finished.

638. If you are servicing a MOD-C monitor, go to step 646. If not, go to next step.

639. Interchange Photomultiplier Temperature Control PC Board (5) with a new one.





NOTE

To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 24. If malfunction symptom still persists, go to step 640. If malfunction is cleared, continue with checkout.

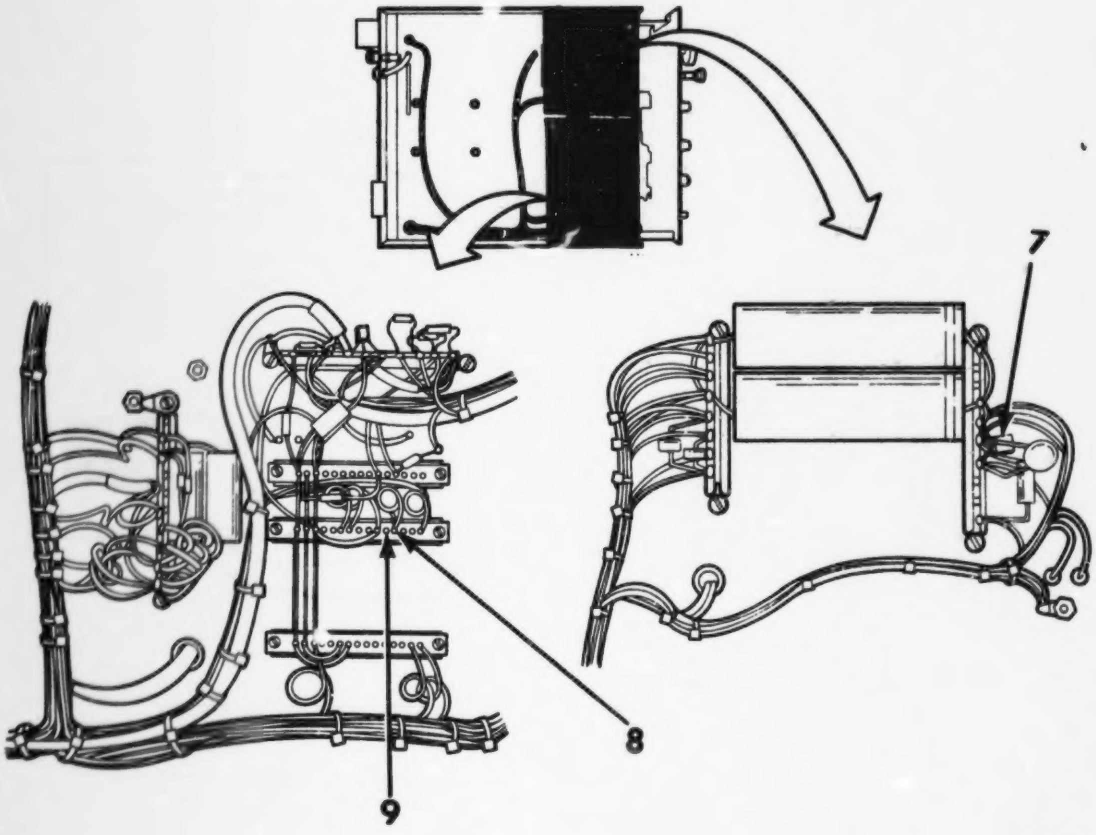
640. Remove new Photomultiplier Temperature Control PC Board (5) from monitor, reinstall old PC Board.

641. Use VOM to measure VDC. Connect positive test lead to J2 pin 4 (8), common test lead to J2 pin 5 (9).

642. Check that VOM indication is stable or smoothly increasing. If indication is erattic, go to step 645.

643. Replace transistor Q2 (6) and transistor Q3 (7).

644. Go to step 1.



645. Next, Replace Detector Cell Assembly, procedure begins at page 7-21. Go on to step 1 when finished.

646. Remove cover (1).

647. Interchange Photomultiplier Temperature Control PC Board (2) with a new one.

NOTE

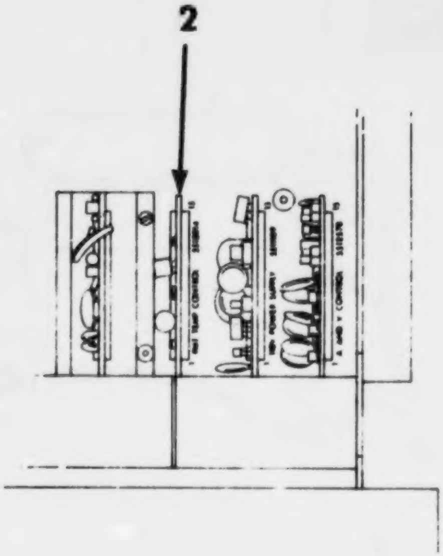
To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 24. If malfunction symptom still persists, go to step 648. If malfunction is cleared, continue with checkout.

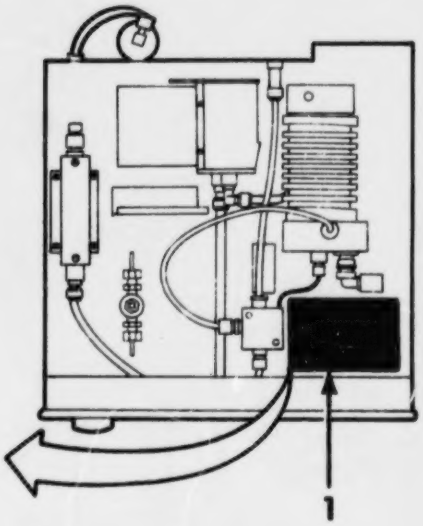
648. Remove new Photomultiplier Temperature Control PC Board (2) from monitor, reinstall old PC Board.

649. Reinstall cover.

650. Use VOM to measure VDC. Connect positive test lead to J2 pin 4 (3), common test lead to J2 pin 5 (4).

651. Check that VOM indication is stable or smoothly increasing. If indication is erattic, go to step 654.





652. Replace transistor Q2 (6) and transistor Q3 (5).

653. Go to step 1.

654. Next, Replace Detector Cell Assembly, procedure begins at page 7-21. Go on to step 1 when finished.

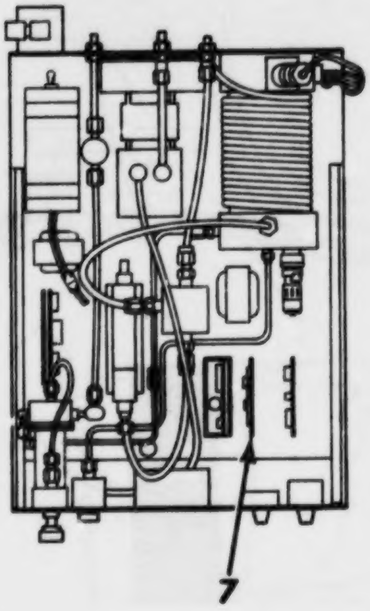
655. If you are servicing a MOD-C monitor, go to step 663. If not, go to next step.

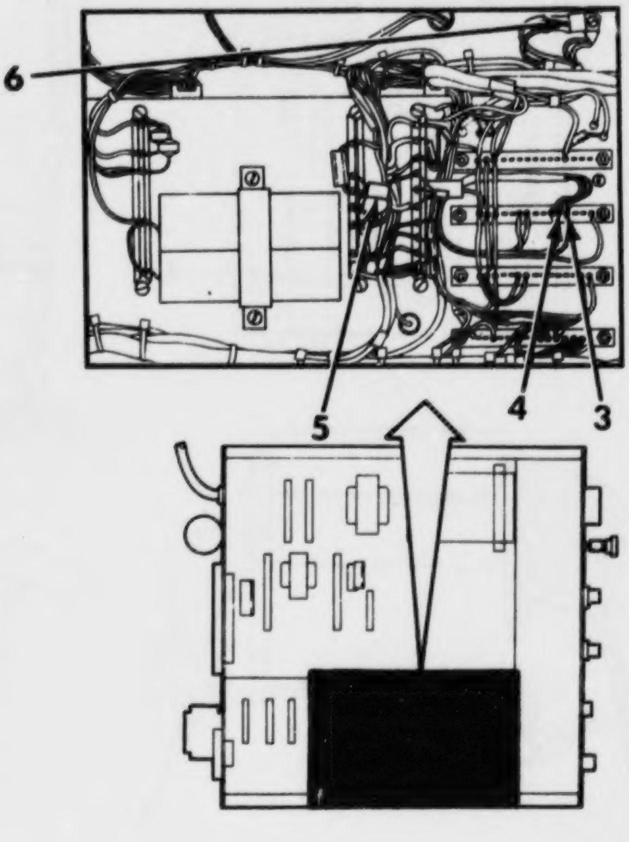
656. Interchange Photomultiplier Temperature Control PC Board (7) with a new one.

NOTE

To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 25. If malfunction symptom still persists, go to step 657. If malfunction is cleared, continue with checkout.

657. Remove new Photomultiplier Temperature Control PC Board (7) from monitor, reinstall old PC Board.





658. Use VOM to measure VDC. Connect positive test lead to J2 pin 4 (1), common test lead to J2 pin 5 (2).

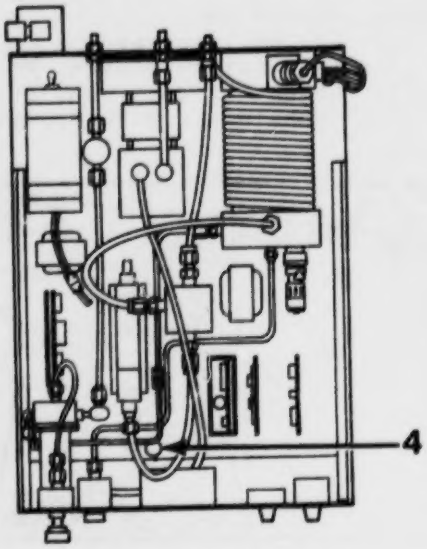
659. Check that VOM indicates 2.4 VDC or more. If not, go to step 662.

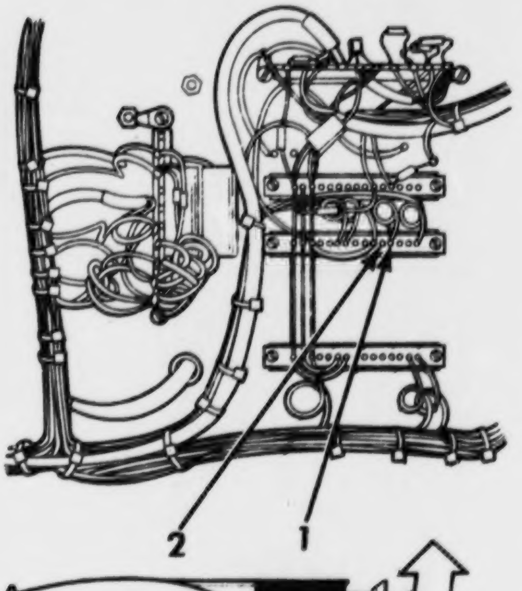
660. Replace transistor Q2 (4) and transistor Q3 (3).

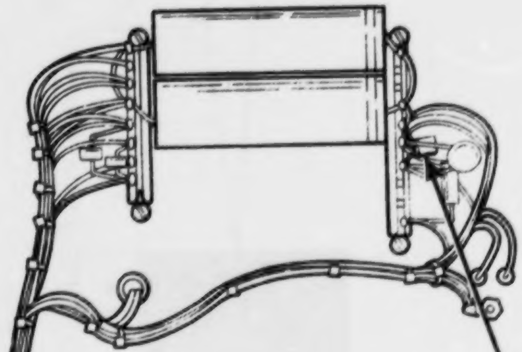
661. Go to step 1.

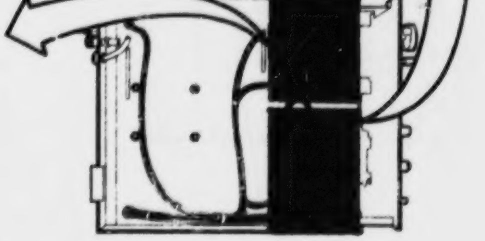
662. Next, Replace Detector Cell Assembly, procedure begins at page 7-21. Go on to step 1 when finished.

663. Remove cover (6).









664. Interchange Photomultiplier Temperature Control PC Board (5) with a new one.

NOTE

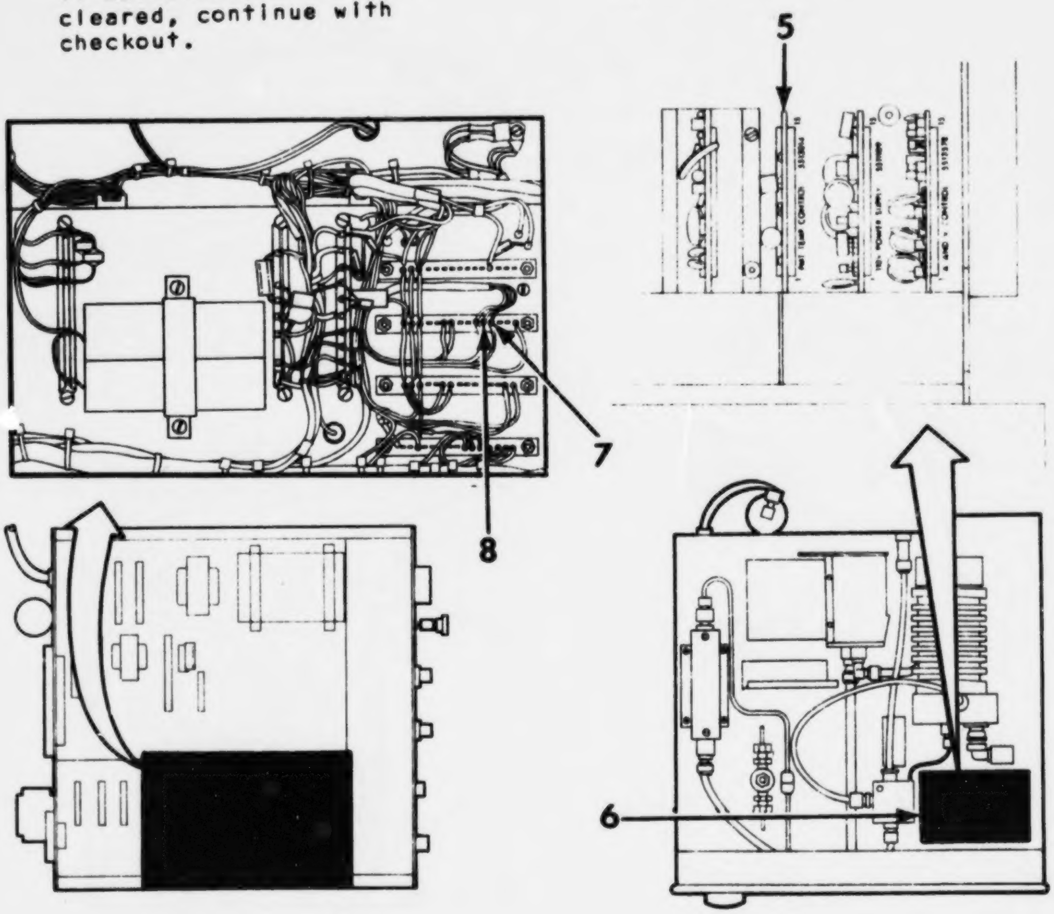
To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 25. If malfunction symptom still persists, go to step 665. If malfunction is cleared, continue with checkout.

665. Remove new Photomultiplier Temperature Control PC Board (5) from monitor, reinstall old PC Board.

666. Reinstall cover.

667. Use VOM to measure VDC. Connect positive test lead to J2 pin 4 (7), common test lead to J2 pin 5 (8).

668. Check that VOM indicates 2.4 VDC or more. If not, go to step 671.



669. Replace transistor Q2 (2) and transistor Q3 (1).

670. Go to step 1.

671. Next, Replace Detector Cell Assembly, procedure begins at page 7-21 . Go on to step 1 when finished.

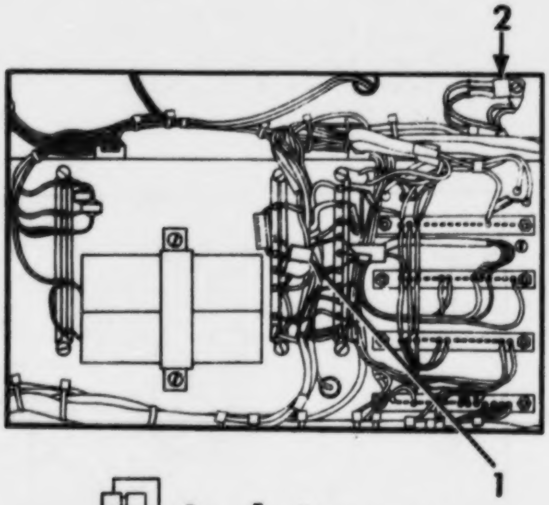
672. If you are servicing a MOD C monitor, go to step 693. If not, go to next step.

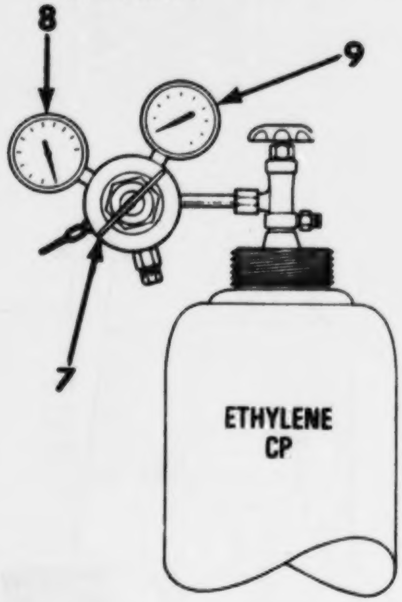
673. Set the POWER switch to OFF.

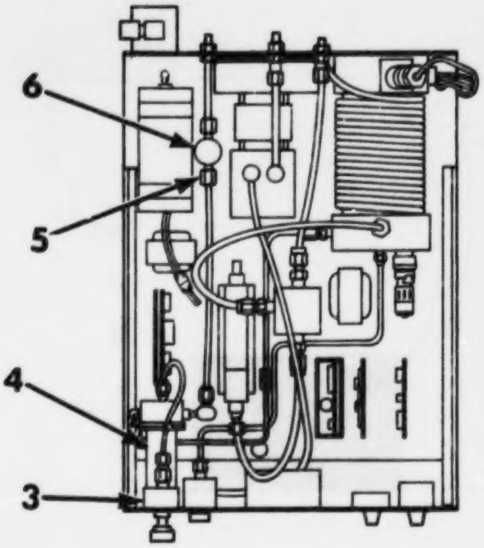
674. Check that ethylene cylinder gauge (9) indicates 50 psi or more. If not, replace ethylene cylinder.

675. Check that output gauge (8) indicates 30 psi. If not, adjust pressure regulating control (7).

676. Inspect ethylene plumbing for sharp bends or other damage that could restrict ethylene flow. Replace any damaged plumbing and go to step 1.







677. Loosen fitting (5) on ethylene valve.

678. Apply leak detector solution to fitting (5).

WARNING

Use extreme caution when performing the following steps. Apply power to monitor to make flow check and immediately set power to OFF.

679. Set the POWER switch to ON.

680. Check that bubbles appear at fitting (5). If not, go to step 687.

681. Set the POWER switch to OFF.

682. Tighten fitting.

683. Interchange gauge (3) with a servicable one.

684. Set the POWER switch to ON.

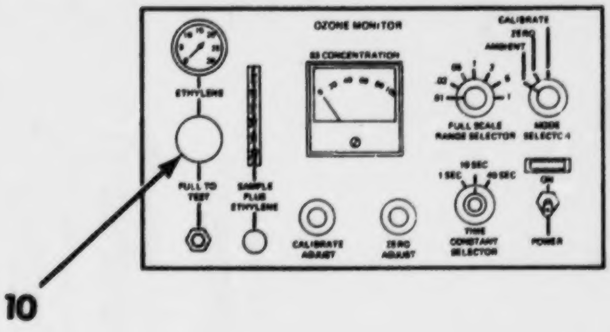
685. Adjust ethylene pressure regulator (10) to pressure specified on supplied data sheet. If pressure cannot be adjusted, replace ethylene regulator (4), go to step 1.

686. Go to step 1.

687. Set the POWER switch to OFF.

688. Disconnect AC power from monitor.

689. Disconnect wiring from ethylene solenoid valve (6).


OZONE MONITOR
ETHYLENE
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
.01
.02
1
FULL SCALE RANGE SELECTOR
MODE SELECTC 4
PULL TO TEST
SAMPLE PLUS ETHYLENE
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
10

690. Use VOM to measure OHMS. Connect positive test lead to white wire (4), common test lead to white wire (3).

691. Check that VOM indicates 15 ohms or less. If not, repair or replace wiring and connectors as necessary; go to step 1.

692. Replace Ethylene Solenoid Valve (8). Go to step 1.

693. Set the POWER switch to OFF.

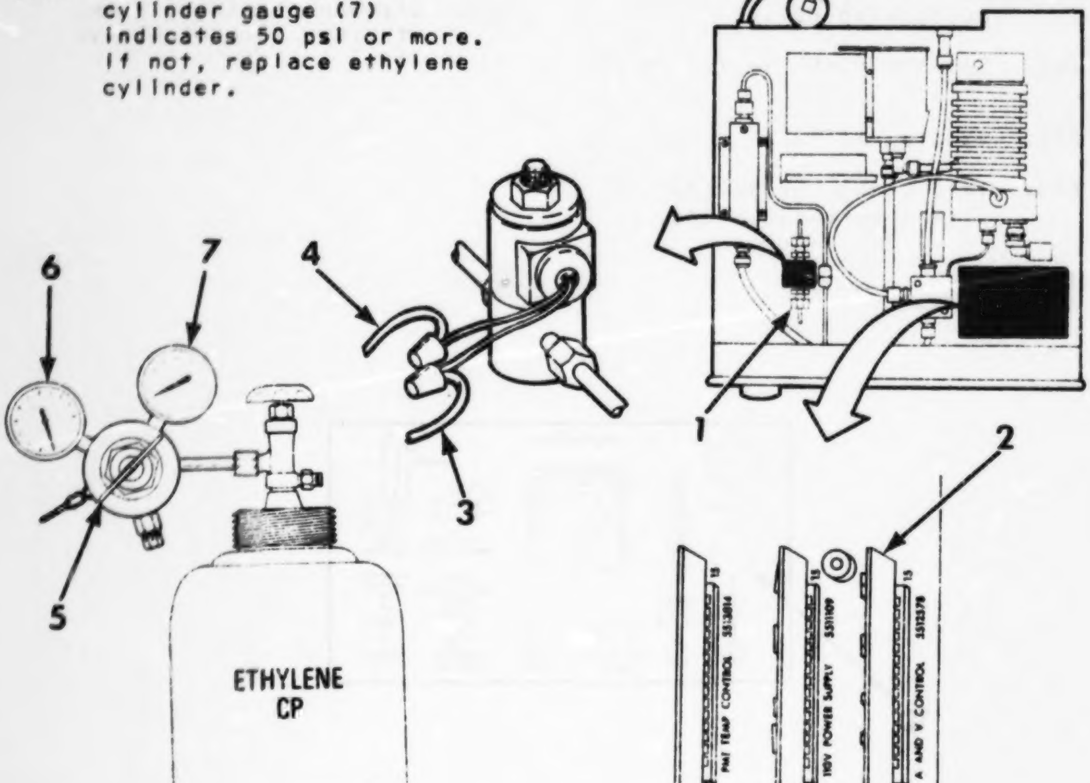
694. Check that ethylene cylinder gauge (7) indicates 50 psi or more. If not, replace ethylene cylinder.

695. Check that output gauge (6) indicates 30 psi. If not, adjust pressure regulating control (5).

696. Inspect ethylene plumbing for sharp bends or other damage that could restrict ethylene flow. Replace any damaged lumbing and go to step 1.

697. Loosen fitting (1) on ethylene valve.

698. Apply leak detector solution to fitting (1).


6
7
4
1
2
3
5
ETHYLENE CP
15
PMT TEMP CONTROL 3512014
1
15
110V POWER SUPPLY 3511109
1
15
A AND V CONTROL 3512378
1

WARNING

Use extreme caution when performing the following steps. Apply power to monitor to make flow check and immediately set power to OFF.

699. Set the POWER switch to ON.

700. Check that bubbles appear at fitting (1). If not, go to step 707.

701. Set the POWER switch to OFF.

702. Tighten fitting.

703. Interchange gauge (11) with a servicable one.

704. Set the POWER switch to ON.

705. Adjust ethylene pressure regulator (9) tc pressure specified on supplied data sheet. If pressure cannot be adjusted, replace ethylene regulator (10), go to step 1.

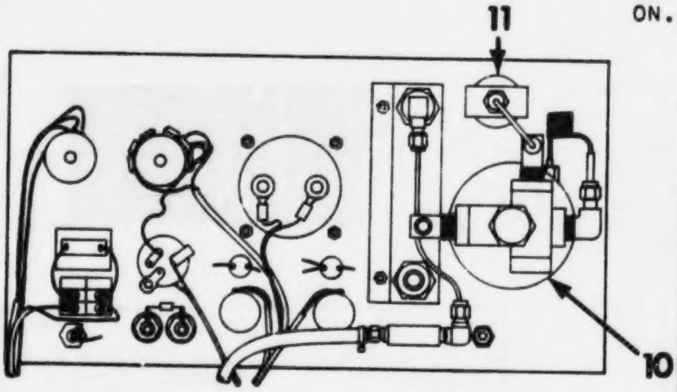
706. Go to step 1.

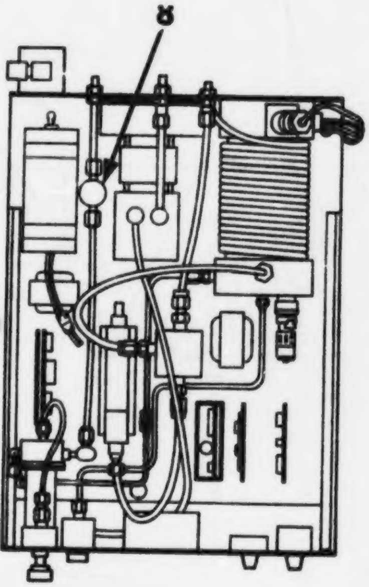
707. Set the POWER switch to OFF.

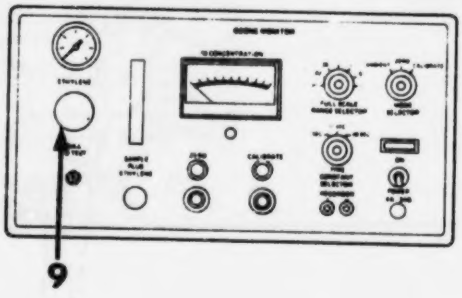
708. Tighten fitting.

709. Interchange Alarm and Valve Control PC Board (2) with a new one.

710. Set the POWER switch to ON.







711. Adjust ethylene pressure regulator (5) to pressure specified on supplied data sheet. If pressure cannot be adjusted, go to step 713.

712. Go to step 1.

713. Set the POWER switch to OFF.

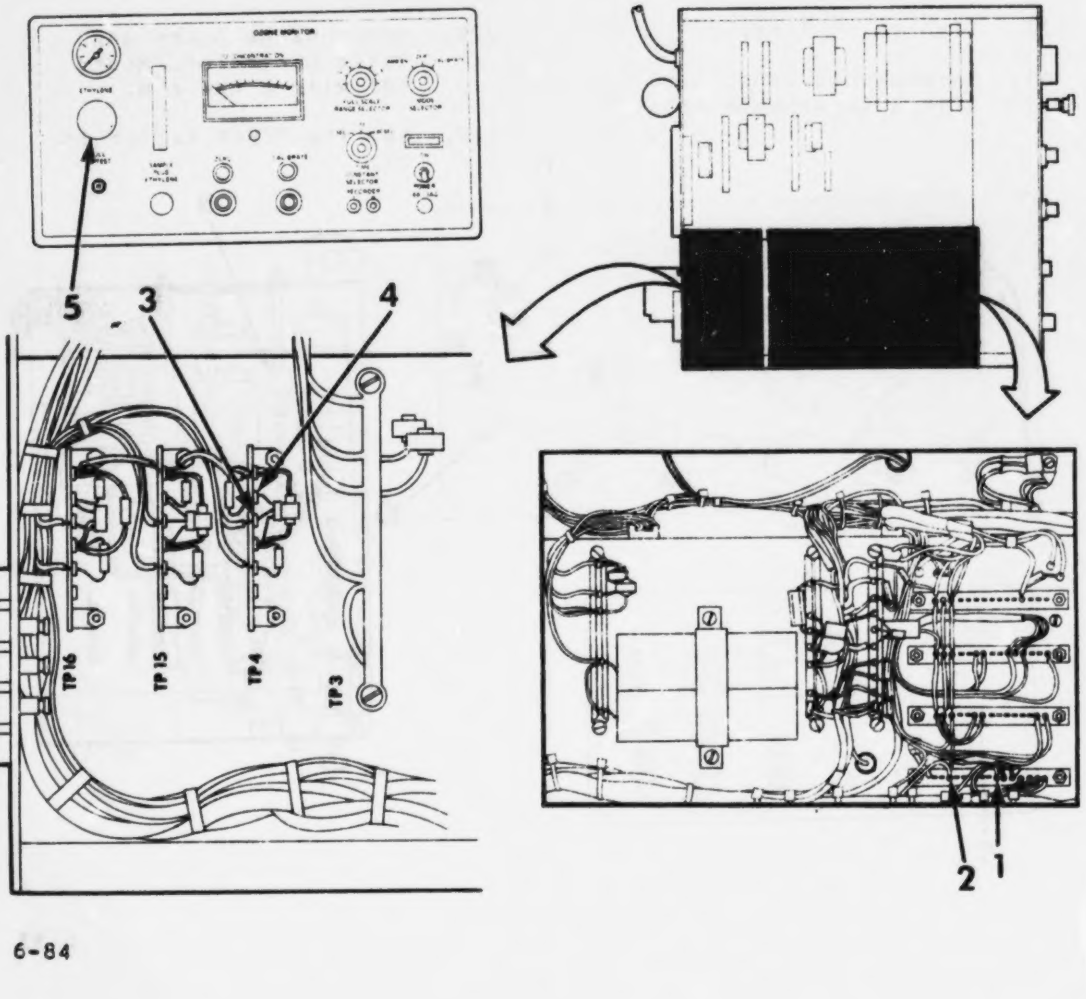
714. Remove new Alarm and Valve Control PC Board (6) from monitor, reinstall old PC Board.

715. Set the POWER switch to ON.

716. Use VOM to measure VDC. Connect positive test lead to J4-7 (1), common test lead to J4-13 (2).

717. Check that VOM indicates 10 VDC or more. If not, go to step 719.

718. Replace Ethylene Solenoid Valve (9). Go to step 1.



719. Set the POWER switch to OFF.

720. Check that shorting bar is attached to SOL terminal (8) and COM terminal (7). If not, connect shorting bar between SOL and COM terminals, go to step 1.

721. Set the POWER switch to ON.

722. Use VOM to measure VDC. Connect positive test lead to TP4-2 (4), common test lead to J4-13 (2).

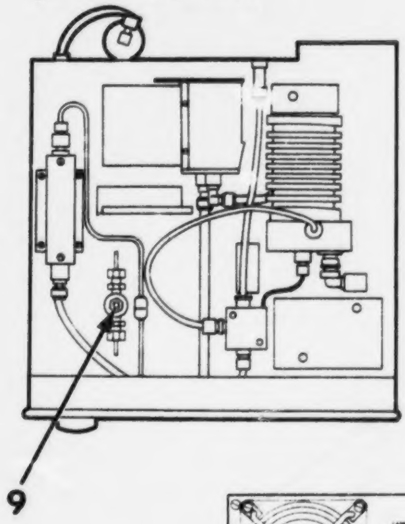
723. Check that VOM indicates 10 VDC or more. If not, go to step 767.

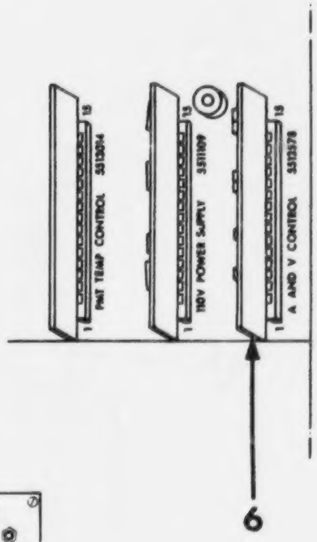
724. Set the POWER switch to OFF.

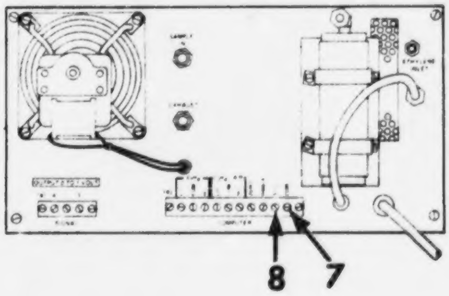
725. Disconnect AC power from monitor.

726. Use VOM to measure OHMS. Connect positive test lead to TP4-2 (4), common test lead to TP4-4 (3).

727. Check that VOM indicates between 700 and 900 ohms. If not, go to step 749.




15
PMT TEMP CONTROL 5313014
1
15
110V POWER SUPPLY 5311109
1
15
A AND V CONTROL 5312578
1
6



728. Use VOM to measure OHMS. Connect positive test lead to TP4-4 (3), common test lead to TP4-2 (4).

729. Check that VOM indicates between 1.1K and 1.3K ohms. If not, go to step 758.

730. Use VOM to measure OHMS. Connect positive test lead to TP4-3 (2), common test lead to TP4-4 (3).

731. Check that VOM indicates between 700 and 900 ohms. If not, replace Q6 (5). Go to step 1.

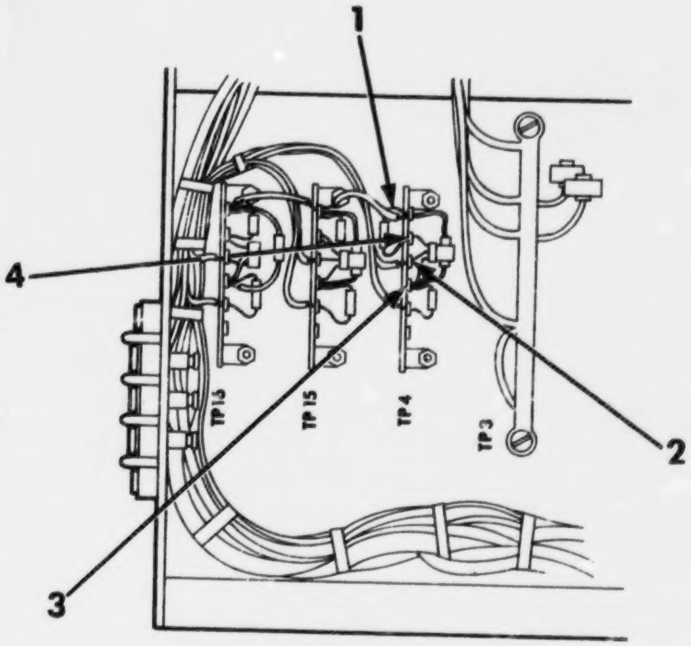
732. Use VOM to measure OHMS. Connect positive test lead to TP4-4 (3), common test lead to TP4-3 (2).

733. Check that VOM indicates between 7K and 10K ohms. If not, replace Q6 (5). Go to step 1.

734. Use VOM to measure OHMS. Connect positive test lead to TP4-3 (2), common test lead to TP4-2 (4).

735. Check that VOM indicates 1K ohms or more. If not, replace Q6 (5). Go to step 1.

736. Disconnect resistor lead (1) from TP4-1.



737. Use VOM to measure OHMS. Connect positive test lead to resistor lead (1), common test lead to resistor lead (4).

738. Check that VOM indicates between 19 and 21 ohms. If not, replace R32 (8). Go to step 1.

739. Reconnect resistor lead to TP4-1.

740. Disconnect resistor lead (10) from TP4-1.

741. Use VOM to measure OHMS. Connect positive test lead to resistor lead (10), common test lead to resistor lead (3).

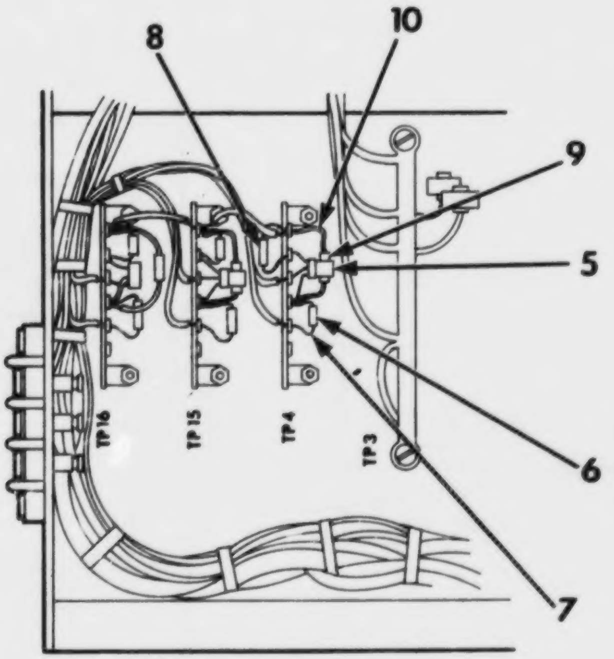
742. Check that VOM indicates between 1.1 and 1.3K ohms. If not, replace R26 (9). Go to step 1.

743. Reconnect resistor lead to TP4-1.

744. Disconnect resistor lead (7) from TP4-5.

745. Use VOM to measure OHMS. Connect positive test lead to resistor lead (7), common test lead to resistor lead (3).

746. Check that VOM indicates between 6K and 6.5K ohms. If not, replace R29 (6). Go to step 1.



747. Reconnect resistor lead to TP4-5.

748. Repair or replace wiring and connectors as necessary. Go to step 1.

749. Disconnect resistor lead (6) from TP4-1.

750. Use VOM to measure OHMS. Connect positive test lead to resistor lead (6), common test lead to resistor lead (3).

751. Check that VOM indicates between 19 and 21 ohms. If not, replace R32 (2). Go to step 758.

752. Reconnect resistor lead to TP4-1.

753. Disconnect resistor lead (7) from TP4-1.

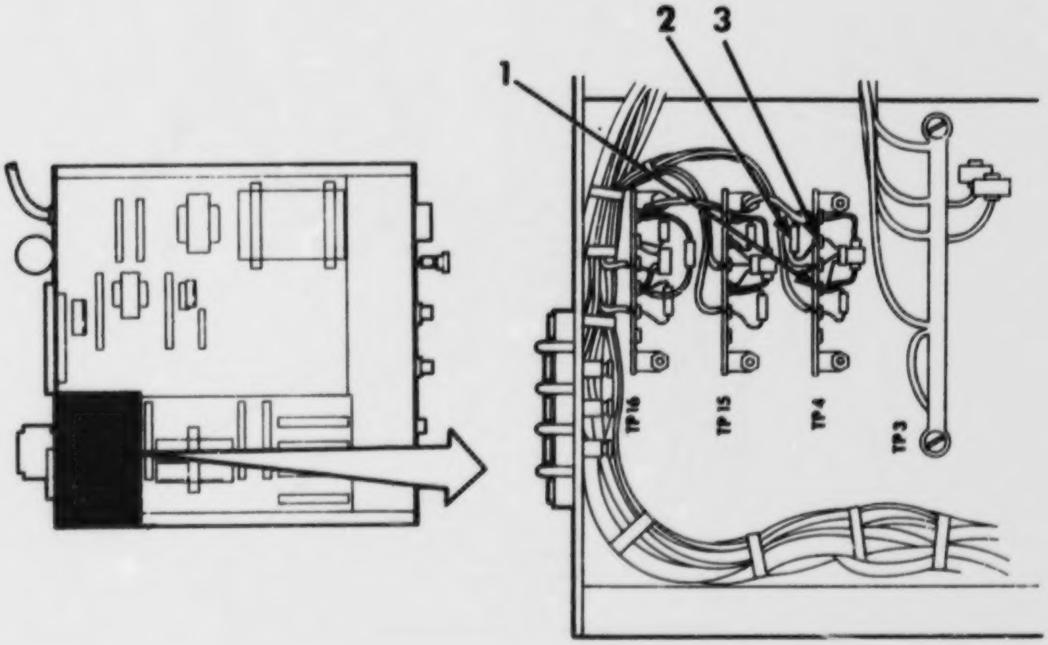
754. Use VOM to measure OHMS. Connect positive test lead to resistor lead (7), common test lead to resistor lead (1).

755. Check that VOM indicates between 1.1 and 1.3K ohms. If not, replace R26 (4). Go to step 758.

756. Reconnect resistor lead to TP4-1.

757. Replace Q6 (5). Go to step 1.

758. Disconnect resistor lead (7) from TP4-1.



759. Use VOM to measure OHMS. Connect positive test lead to resistor lead (7), common test lead to resistor lead (1).

760. Check that VOM indicates between 1.1 and 1.3K ohms. If not, replace R26 (4). Go to step 762.

761. Reconnect resistor lead to TP4-1.

762. Use VOM to measure OHMS. Connect positive test lead to TP4-2 (3), common test lead to TP4-4 (1).

763. Check that VOM indicates between 700 and 900 ohms. If not, replace Q6 (5). Go to step 1.

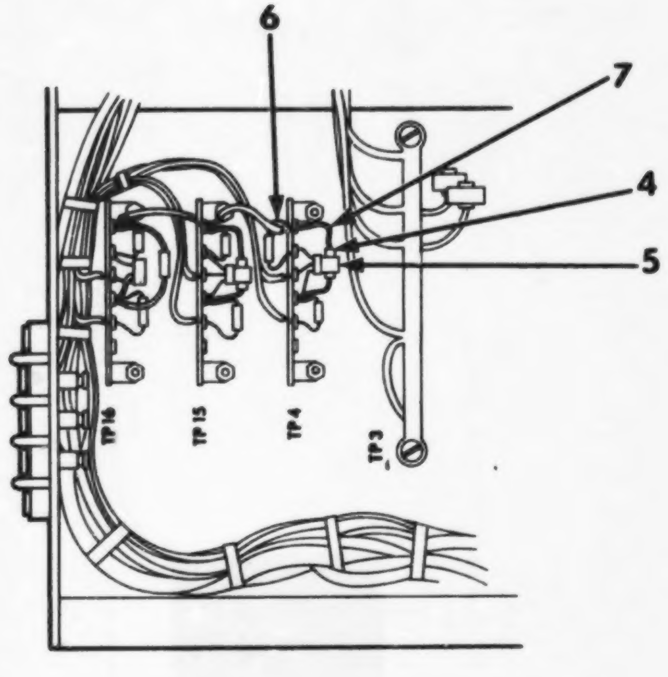
764. Use VOM to measure OHMS. Connect positive test lead to TP4-4 (1), common test lead to TP4-2 (3).

765. Check that VOM indicates between 1.1K and 1.3K ohms. If not, replace q6 (5). Go to step 1.

766. Go to step 1.

767. Set the POWER switch to OFF.

768. Disconnect AC power from monitor.

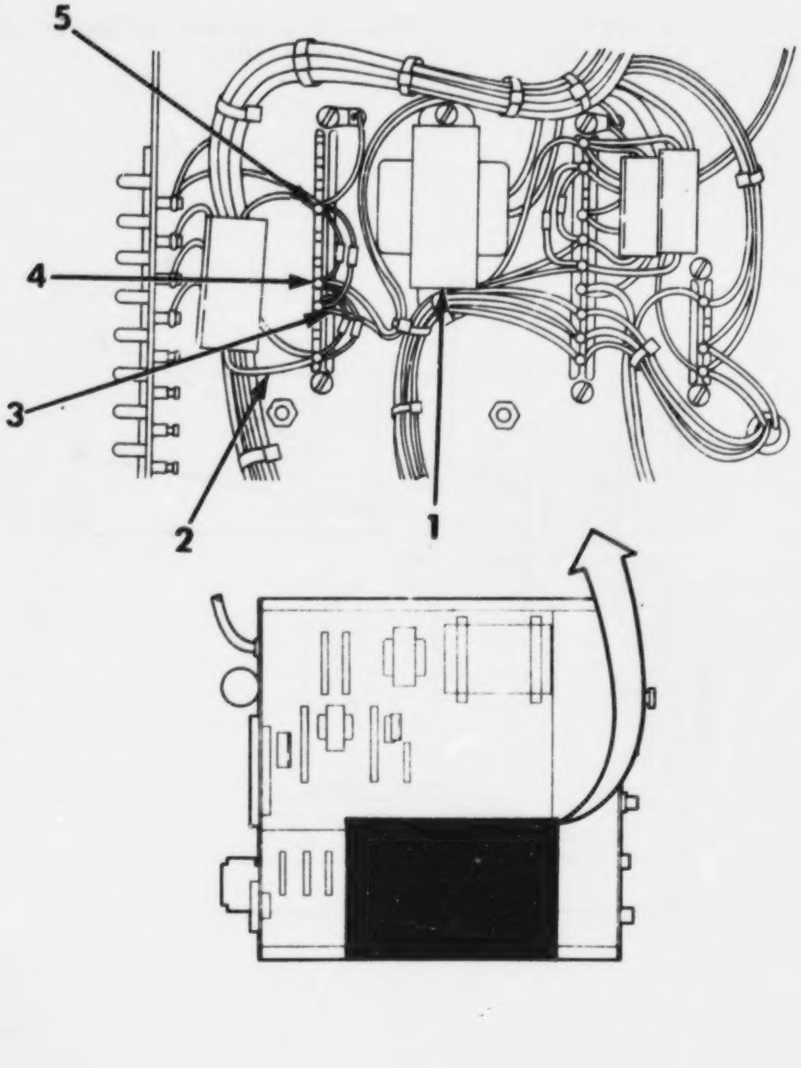


769. Use VOM to measure OHMS. Connect positive test lead to TP2-7 (4), common test lead to TP2-10 (2).

770. Check that VOM indicates 15 ohms or less. If not, replace CR5 (6). Go to step 1.

771. Use VOM to measure OHMS. Connect positive test lead to TP2-8 (3), common test lead to TP2-10 (2).

772. Check that VOM indicates 15 ohms or less. If not, replace CR6 (7). Go to step 1.



773. Use VOM to measure OHMS. Connect positive test lead to TP2-4 (5), common test lead to TP2-7 (4).

774. Check that VOM indicates 15 ohms or less. If not, replace CR7 (9). Go to step 1.

775. Use VOM to measure OHMS. Connect positive test lead to TP2-4 (5), common test lead to TP2-8 (3).

776. Check that VOM indicates 15 ohms or less. If not, replace CR8 (10). Go to step 1.

777. Disconnect capacitor lead (2) from TP2-10.

778. Use VOM to measure OHMS. Connect positive test lead to capacitor lead (2), common test lead to TP2-4 (5).

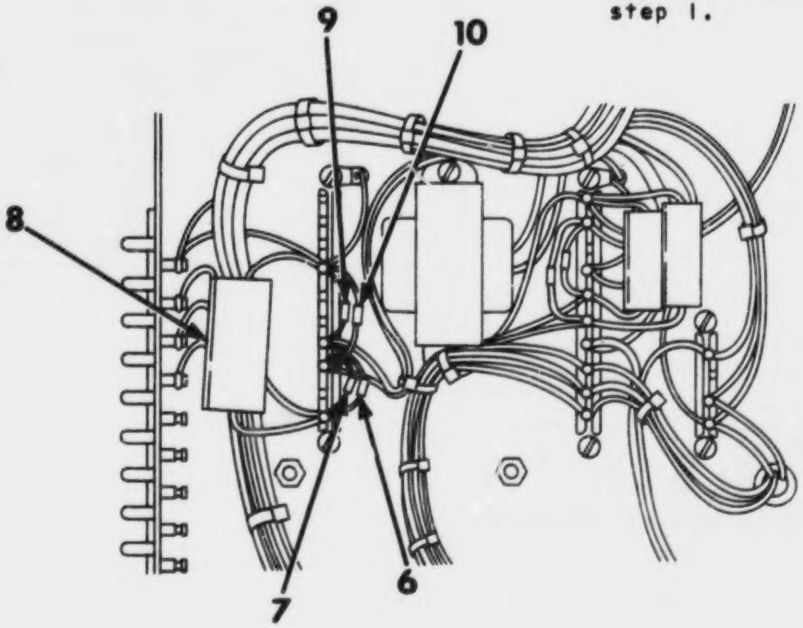
779. Check that VOM deflects sharply to 0, then increases to 100K ohms or more. If not, replace C10 (8), go to step 1.

780. Reconnect capacitor lead to TP2-10.

781. Disconnect blue wire (3) from TP2-8.

782. Use VOM to measure OHMS. Connect positive test lead to blue wire (3), common test lead to TP2-7 (4).

783. Check that VOM indicates 10 ohms or less. If not, replace T3 (1). Go to step 1.



784. Reconnect blue wire to TP2-8.

785. Repair or replace wiring and connectors as necessary. Go to step 1.

786. If you are servicing a MOD C monitor, go to step 791. If not, go to next step.

787. Check that diverter valve (1) is fully depressed. If not, depress diverter valve and go to step 1.

788. Set the POWER switch to OFF.

789. Disconnect AC power from monitor.

790. Replace diverter valve (1). Go to step 1.

791. Check that diverter valve (3) is fully depressed. If not, depress diverter valve and go to step 1.

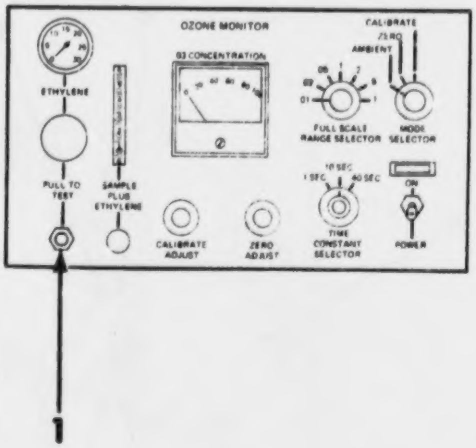
792. Set the POWER switch to OFF.

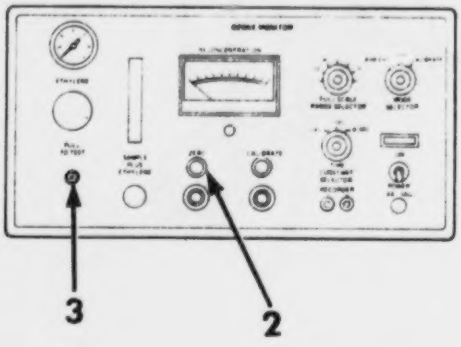
793. Disconnect AC power from monitor.

794. Replace diverter valve (3). Go to step 1.

795. Set the POWER switch to OFF.

796. Disconnect AC power from monitor.


OZONE MONITOR
CALIBRATE
ZERO
AMBIENT
O3 CONCENTRATION
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE PLUS ETHYLENE
1 SEC
10 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
1



797. Disconnect wires (11) from S2B-C.

798. Use VOM to measure OHMS. Connect positive test lead to lamp socket (4), common test lead to lamp socket (5).

799. Check that VOM indicates between 100 and 500 ohms. If not, go to step 804.

800. Reconnect wires to S2B-C.

801. Use VOM to measure OHMS. Connect positive test lead to S2B-2 (12), common test lead to S2B-C (11).

802. Check that VOM indicates less than 5 ohms. If not, replace MODE switch (10). Go to step 1.

803. Repair or replace wiring and connectors as necessary. Go to step 1.

804. Remove lens cap (2).

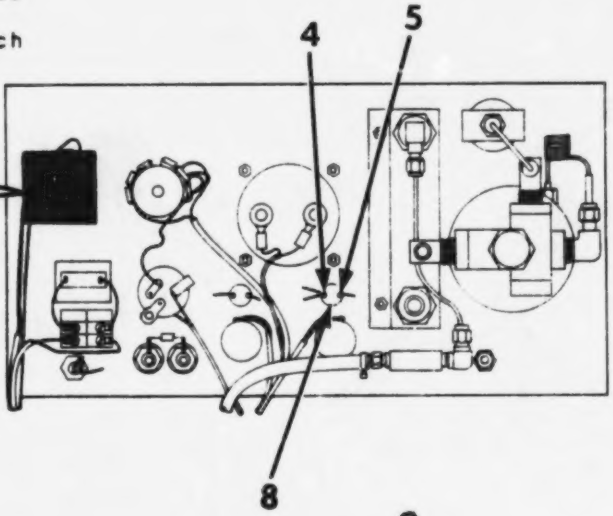
805. Remove lamp (2).

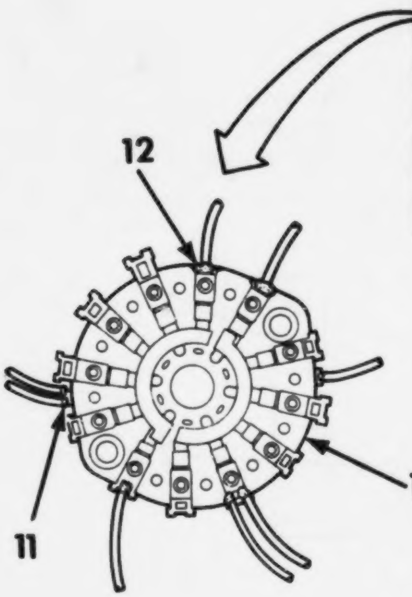
806. Use VOM to measure OHMS. Connect positive test lead to lamp (9), common test lead to lamp (7).

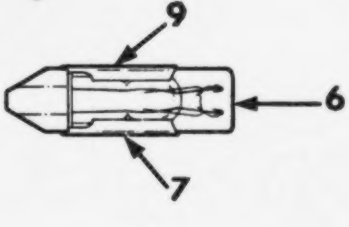
807. Check that VOM indicates between 100 and 500 ohms. If not, go to step 809.

808. Replace lamp socket (8). Go to step 1.

809. Replace lamp (6).







810. Reinstall lens cap.

811. Go to step 1.

812. Set the POWER switch to OFF.

813. Disconnect AC power from monitor.

814. Check that MODE switch switch (5) has no physical damage. If damaged, repair or replace MODE switch switch (5). Go to step 1.

815. Disconnect wires (4) from S2A-3.

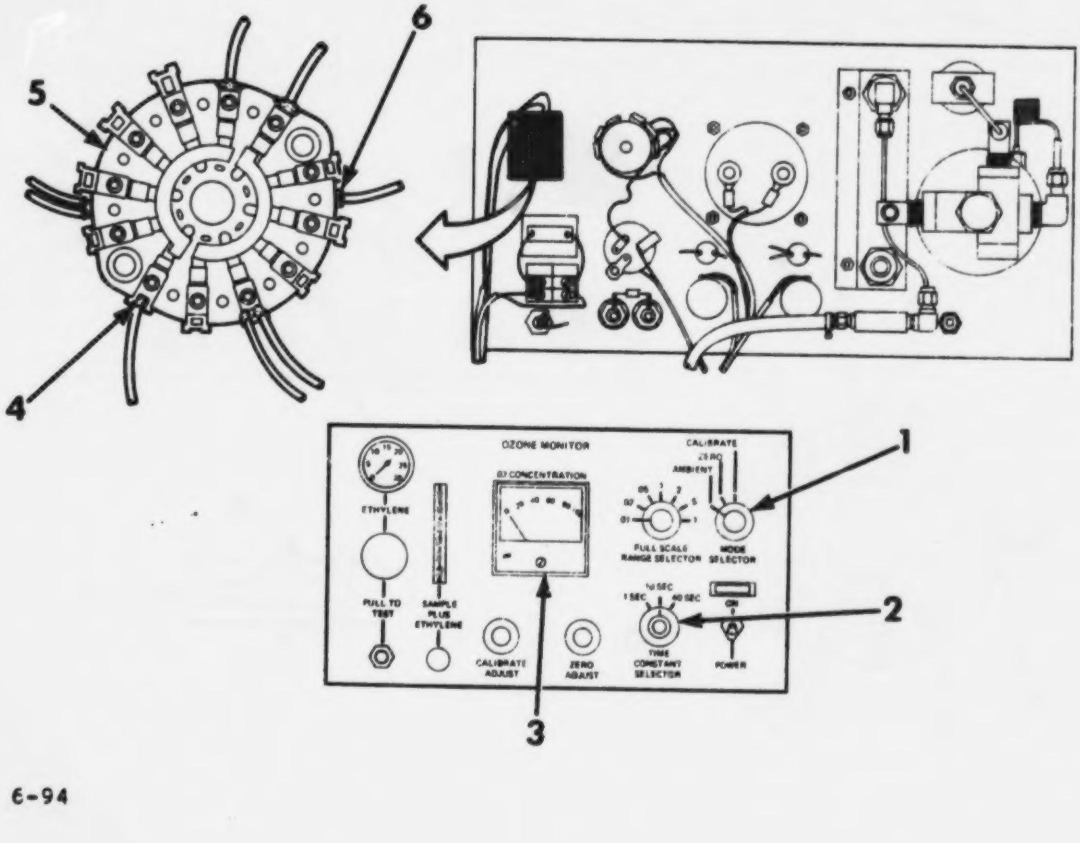
816. Use VOM to measure OHMS. Connect positive test lead to S2A-3 (4), common test lead to S2A-C (6).

817. Check that VOM indicates more than 200 ohms. If not, replace MODE switch (5). Go to step 1.

818. Reconnect wires to S2-3.

819. Repair or replace wiring and connectors as necessary. Go to step 1.

821. Set TIME CONSTANT SELECTOR (2) to 1 sec.


5
6
4
OZONE MONITOR
ETHYLENE
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
1
1 SEC
10 SEC
60 SEC
ON
2
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
3

NOTE

The next step requires timing. Begin timing when MODE SELECTOR is set to AMBIENT.

822. Set MODE SELECTOR (1) to AMBIENT and check that 03 CONCENTRATION meter (3) indicates 30 within 2 to 5 seconds. If not, go to step 833.

823. Set TIME CONSTANT SELECTOR (2) to 40 sec.

NOTE

The next step requires timing. Begin timing when MODE SELECTOR is set to ZERO.

824. Set MODE SELECTOR (1) to ZERO and check that 03 CONCENTRATION meter (3) indicates 20 within 30 to 50 seconds. If not, go to step 848.

825. Set the POWER switch to OFF.

826. Disconnect AC power from monitor.

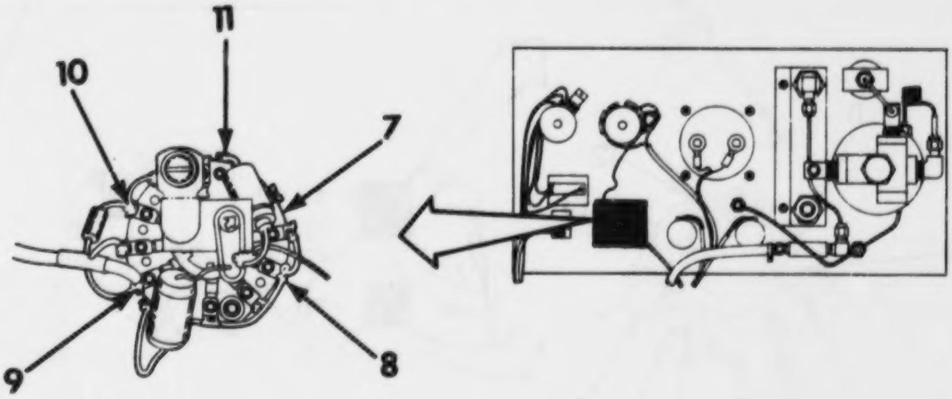
827. Set TIME CONSTANT SELECTOR (2) to 1 sec.

828. Use VOM to measure OHMS. Connect positive test lead to S4A (8), common test lead to S4A-C (11).

829. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR (7). Go to step 1.

830. Use VOM to measure OHMS. Connect positive test lead to S4B (10), common test lead to S4B-C (9).

831. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR (7). Go to step 1.



832. Repair or replace wiring and connectors as necessary. Go to step 1.

833. Set TIME CONSTANT SELECTOR (1) to 40 sec.

NOTE

The next step requires timing. Begin timing when MODE SELECTOR is set to ZERO.

834. Set MODE SELECTOR (3) to ZERO and check that O3 CONCENTRATION meter (2) indicates 20 within 30 to 50 seconds. If not, go to step 861.

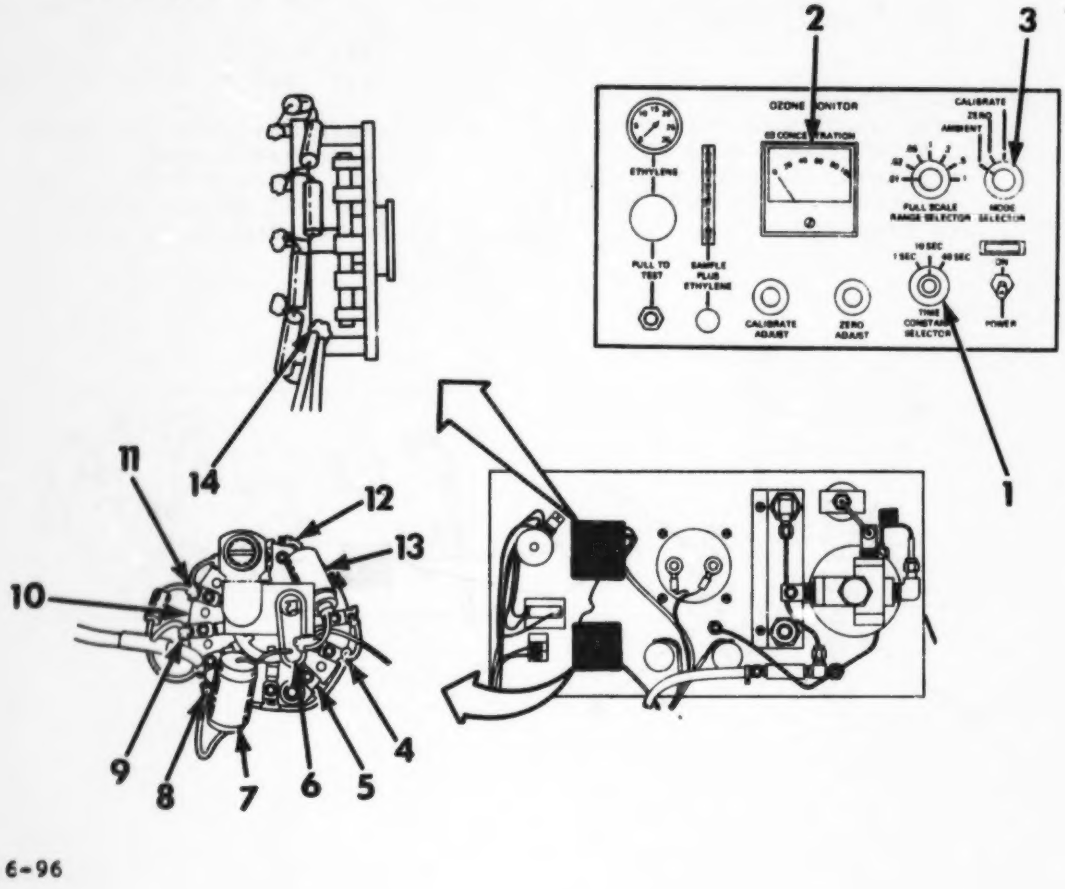
835. Set the POWER switch to OFF.

836. Disconnect AC power from monitor.

837. Use VOM to measure OHMS. Connect positive test lead to S4A (9), common test lead to S3 (14).

838. Check that VOM indicates between 950K and 1.1M ohms. If not, go to step 889.

839. Set TIME CONSTANT SELECTOR (1) to 10 sec.



2
3
OZONE ONITOR
O3 CONCE TRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTAN SELECTOR
ON
POWER
1
14
11
12
13
10
9
8
7
6
5
4

840. Use VOM to measure OHMS. Connect positive test lead to S4A-C (12), common test lead to S4A (4).

841. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (0). Go to step 1.

842. Use VOM to measure OHMS. Connect positive test lead to S4B-C (8), common test lead to S4B (11).

843. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (10). Go to step 1.

844. Use VOM to measure OHMS. Connect positive test lead to TP11 (15), common test lead to TP12 (6).

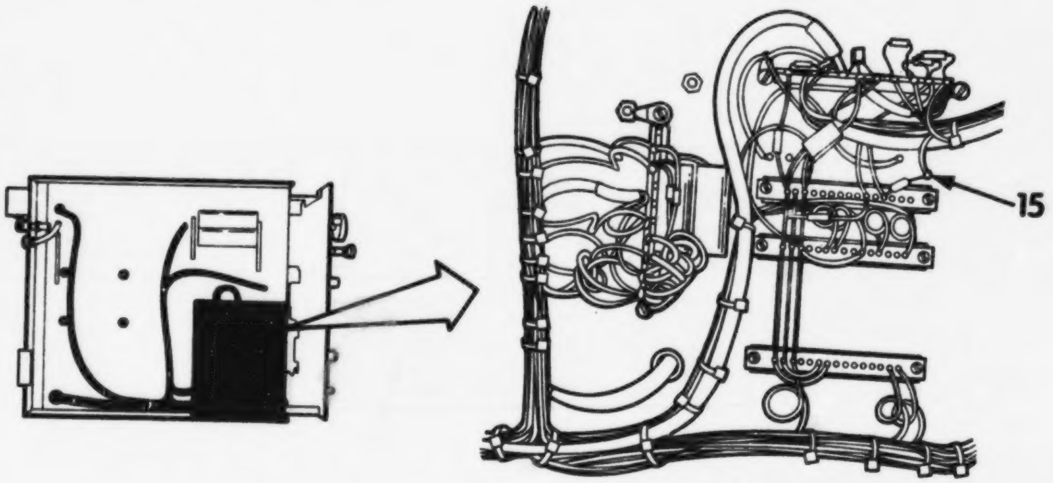
845. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1.

846. Replace C2 (13).

847. Replace C3 (7). Go to step 1.

848. Set the POWER switch to OFF.

849. Disconnect AC power from monitor.



850. Set TIME CONSTANT SELECTOR (1) to 10 sec.

851. Use VOM to measure OHMS. Connect positive test lead to S4A-C (8), common test lead to S4A (3).

852. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (2). Go to step 1.

853. Use VOM to measure OHMS. Connect positive test lead to S4B-C (5), common test lead to S4B (6).

854. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (2). Go to step 1.

855. Set TIME CONSTANT SELECTOR (1) to 1 sec.

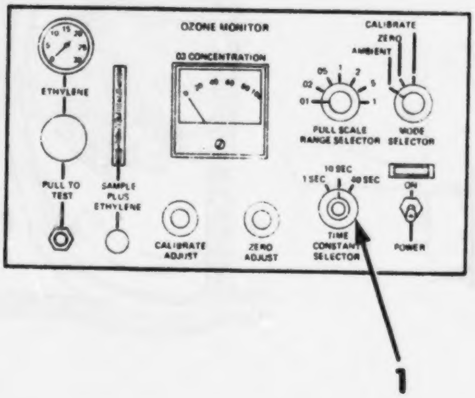
856. Use VOM to measure OHMS. Connect positive test lead to S4A-C (8), common test lead to S4A (4).

857. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (2). Go to step 1.

858. Use VOM to measure OHMS. Connect positive test lead to S4B C (5), common test lead to S4B (7).

859. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (2). Go to step 1.

860. Replace C2 (9). Go to step 1.


OZONE MONITOR
5
10
15
20
25
30
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
0
20
40
60
80
100
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
01
02
05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
1

861. Set the POWER switch to OFF.

862. Disconnect AC power from monitor.

863. Set TIME CONSTANT SELECTOR (1) to 1 sec.

864. Use VOM to measure OHMS. Connect positive test lead to S4A-C (8), common test lead to S4A (4).

865. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (2). Go to step 1.

866. Use VOM to measure OHMS. Connect positive test lead to S4B-C (5), common test lead to S4B (7).

867. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (2). Go to step 1.

868. Set TIME CONSTANT SELECTOR (1) to 10 sec.

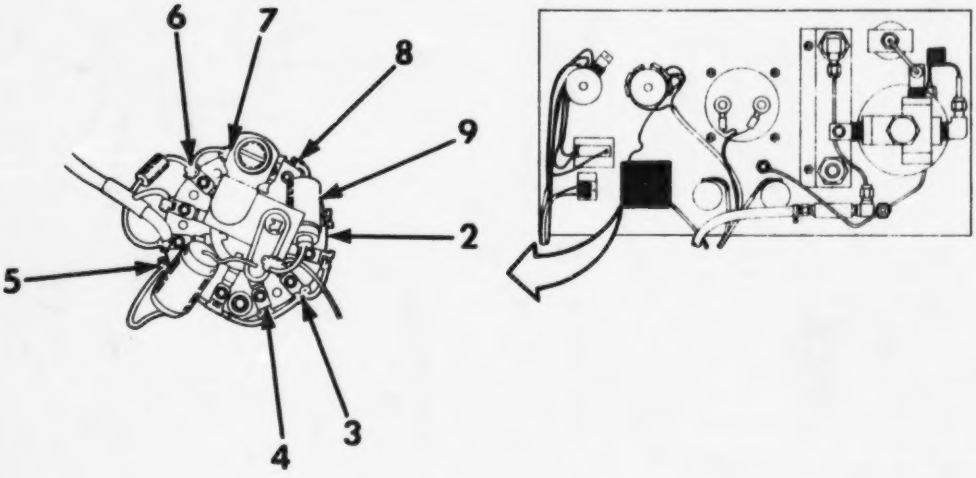
869. Use VOM to measure OHMS. Connect positive test lead to S4A-C (8), common test lead to S4A (3).

870. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (2). Go to step 1.

871. Use VOM to measure OHMS. Connect positive test lead to S4B-C (5), common test lead to S4B (6).

872. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (2). Go to step 1.

873. Set TIME CONSTANT SELECTOR (1) to 1 sec.



874. Use VOM to measure OHMS. Connect positive test lead to S4A-C (9), common test lead to S4A (1).

875. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (10). Go to step 1.

876. Use VOM to measure OHMS. Connect positive test lead to S4B-C (4), common test lead to S4B (6).

877. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (10). Go to step 1.

878. Remove Electometer Amplifier P.C. Board (13).

879. Remove shield (14).

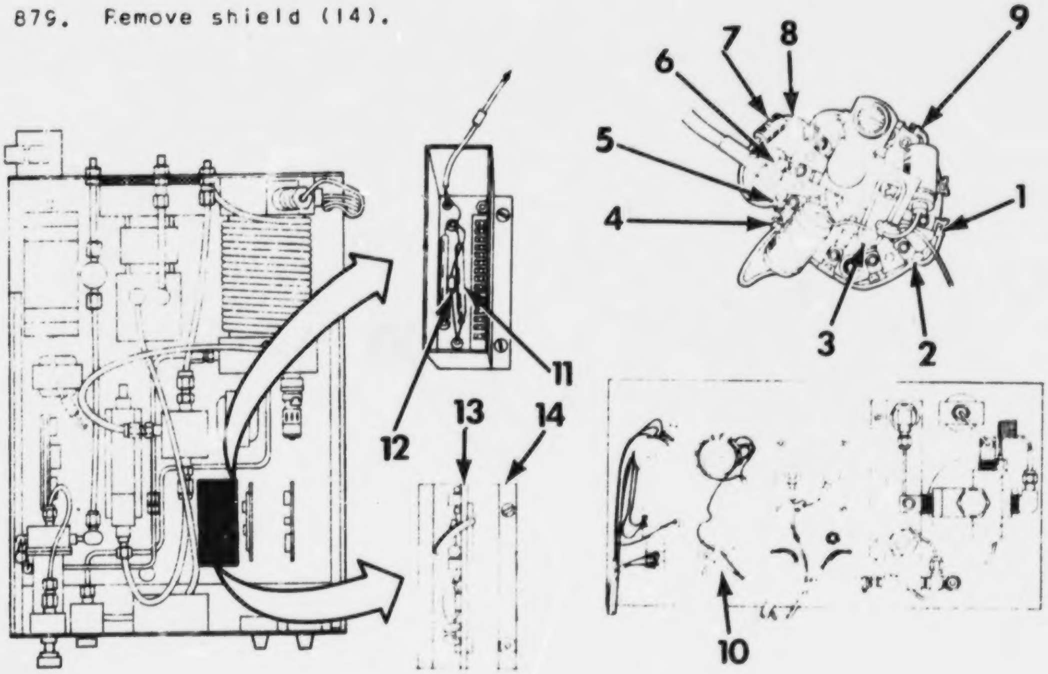
880. Use VOM to measure OHMS. Connect positive test lead to terminal (16), common test lead to S4A (2).

881. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1.

882. Use VOM to measure OHMS. Connect positive test lead to TP12 (3), common test lead to terminal (15).

883. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1.

884. Replace R3 (11).



885. Replace C1 (12).

886. Reinstall shield.

887. Reinstall Electrometer Amplifier P.C. Board.

888. Go to step 1.

889. Remove resistor lead (8).

890. Use VOM to measure OHMS. Connect positive test lead to R12 (8), common test lead to R12 (5).

891. Check that VOM indicates between 950K and 1.1M ohms. If not, replace R12 (7). Go to step 1.

892. Reconnect resistor lead to terminal.

893. Repair or replace wiring and connectors as necessary. Go to step 1.

894. Set TIME CONSTANT SELECTOR (17) to 40 sec.

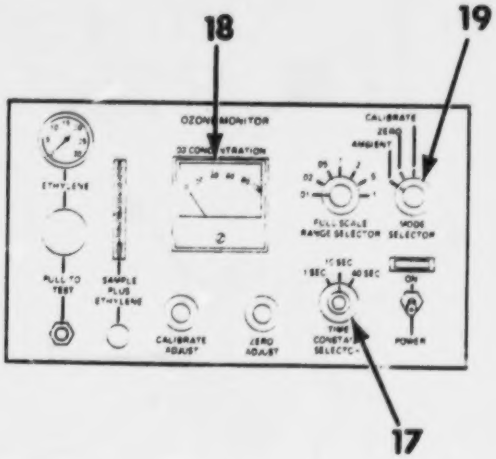
NOTE

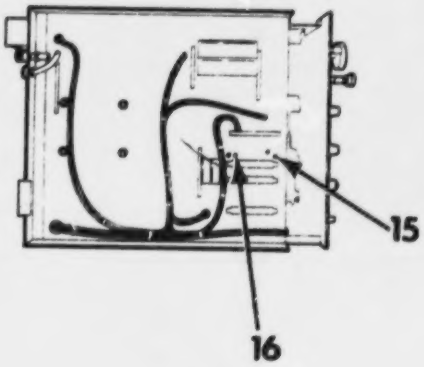
The next step requires timing. Begin timing when MODE SELECTOR is set to ZERO.

895. Set MODE SELECTOR (19) to ZERO and check that O3 CONCENTRATION meter (18) indicates 20 within 30 to 50 seconds. If not, go to step 905.

896. Set the POWER switch to OFF.

897. Disconnect AC power from monitor.


18
19
17
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER



898. Use VOM to measure OHMS. Connect positive test lead to S4A (2), common test lead to S4B (7).

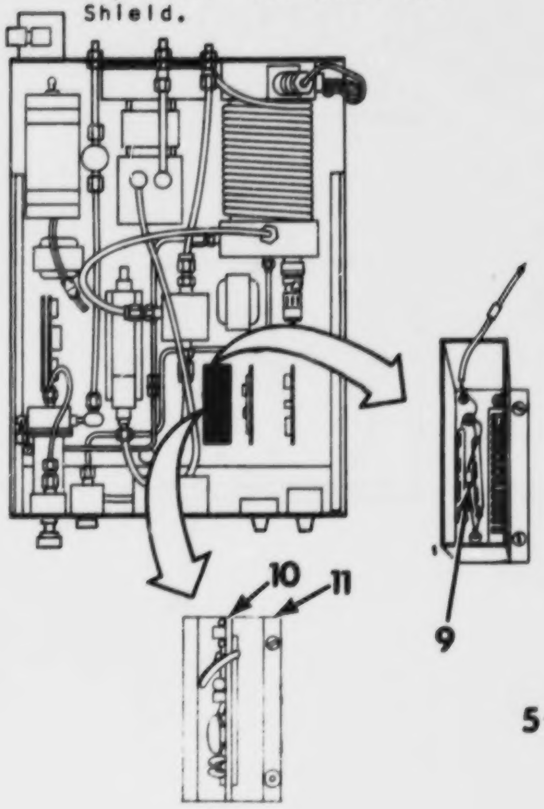
899. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1.

900. Remove Electrometer Amplifier P.C. Board (10).

901. Remove shield (11).

902. Replace C1 (9).

903. Reinstall Electrometer Amplifier P.C. Board and Shield.



904. Go to step 1.

905. Set the POWER switch to OFF.

906. Disconnect AC power from monitor.

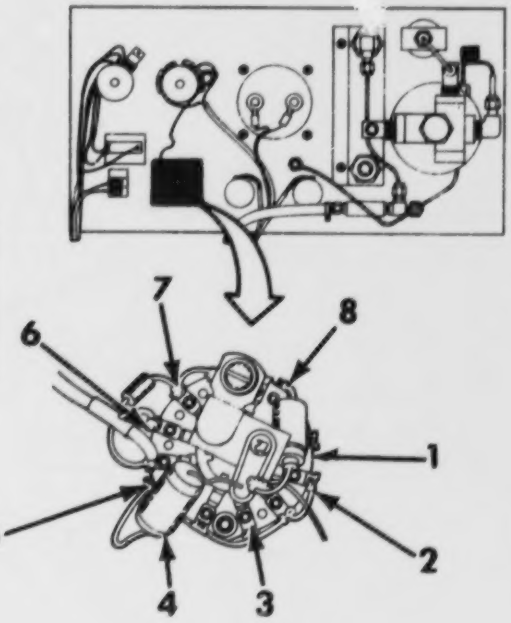
907. Replace TIME CONSTANT SELECTOR switch (1). Go to step 1.

908. Set the POWER switch to OFF.

909. Disconnect AC power from monitor.

910. Use VOM to measure OHMS. Connect positive test lead to S4A-C (8), common test lead to S4A (2).

911. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (1). Go to step 1.



912. Use VOM to measure OHMS. Connect positive test lead to S4B-C (5), common test lead to S4B (6).

913. Check that VOM indicates less than 5 ohms. If not, replace TIME CONSTANT SELECTOR switch (1). Go to step 1.

914. Replace C3 (4). Go to step 1.

915. Set the POWER switch to OFF.

916. Disconnect AC power from monitor.

917. Disconnect wires (15) from S2A-C.

918. Use VOM to measure OHMS. Connect positive test lead to lamp socket (13), common test lead to lamp socket (14).

919. Check that VOM indicates between 100 and 500 ohms. If not, go to step 924.

920. Reconnect wires to S2-C.

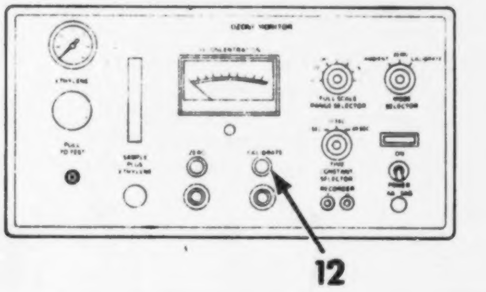
921. Use VOM to measure OHMS. Connect positive test lead to S2A-3 (16), common test lead to S2A-C (15).

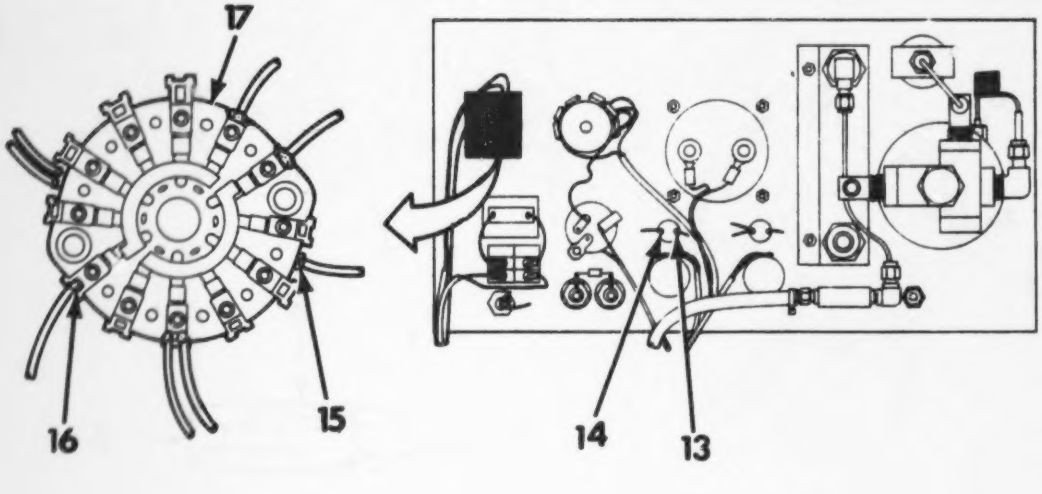
922. Check that VOM indicates less than 5 ohms. If not, replace MODE switch (17). Go to step 1.

923. Repair or replace wiring and connectors as necessary. Go to step 1.

924. Remove lens cap (12).

925. Remove lamp (12).





926. Use VOM to measure OHMS. Connect positive test lead to lamp (4), common test lead to lamp (3).

927. Check that VOM indicates between 100 and 500 ohms. If not, go to step 929.

928. Replace lamp socket (1). Go to step 1.

929. Replace lamp (2).

930. Reinstall lens cap.

931. Go to step 1.

932. Set the POWER switch to OFF.

933. Disconnect AC power from monitor.

934. Check that MODE switch (6) has no physical damage. If damaged, repair or replace MODE switch (6). Go to step 1.

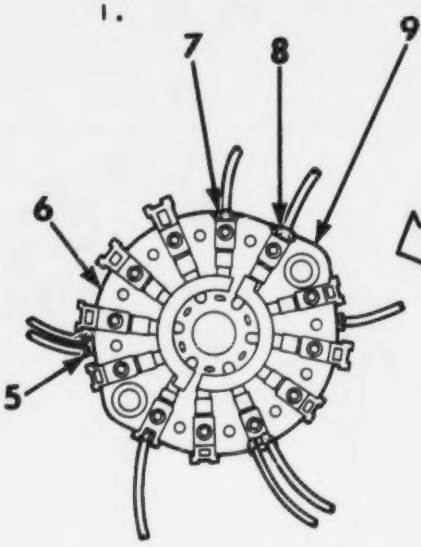
935. Disconnect wires (7) from S2B-2.

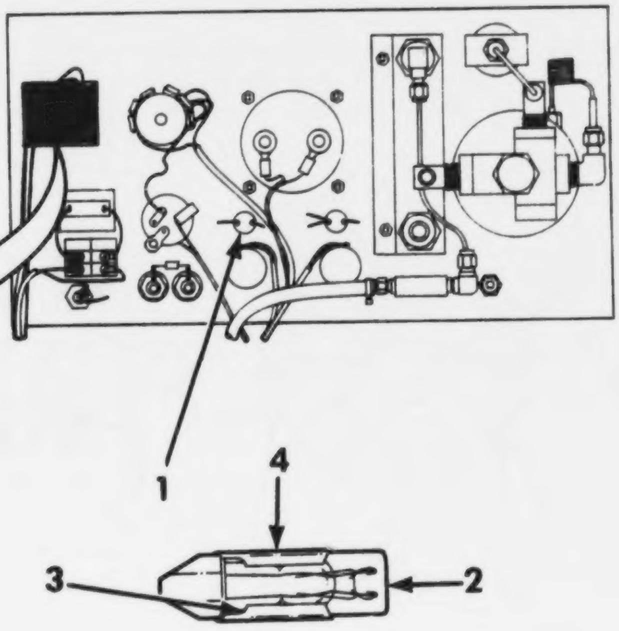
936. Use VOM to measure OHMS. Connect positive test lead to S2B-2 (7), common test lead to S2B-C (5).

937. Check that VOM indicates more than 50K ohms. If not, replace MODE switch (9). Go to step 1.

938. Reconnect wires to S2B-2.

939. Repair or replace wiring and connectors as necessary. Go to step 1.





941. Use VOM to measure VDC. Connect positive test lead to TP16-1 (12), common test lead to ground.

942. Check that VOM indicates between 12 and 18 VDC. If not, repair or replace wiring and connectors as necessary; go to step 1.

943. Set the POWER switch to OFF.

944. Disconnect AC power from monitor.

945. Use VOM to measure OHMS. Connect positive test lead to S2B-1 (8), common test lead to S2B-C (5).

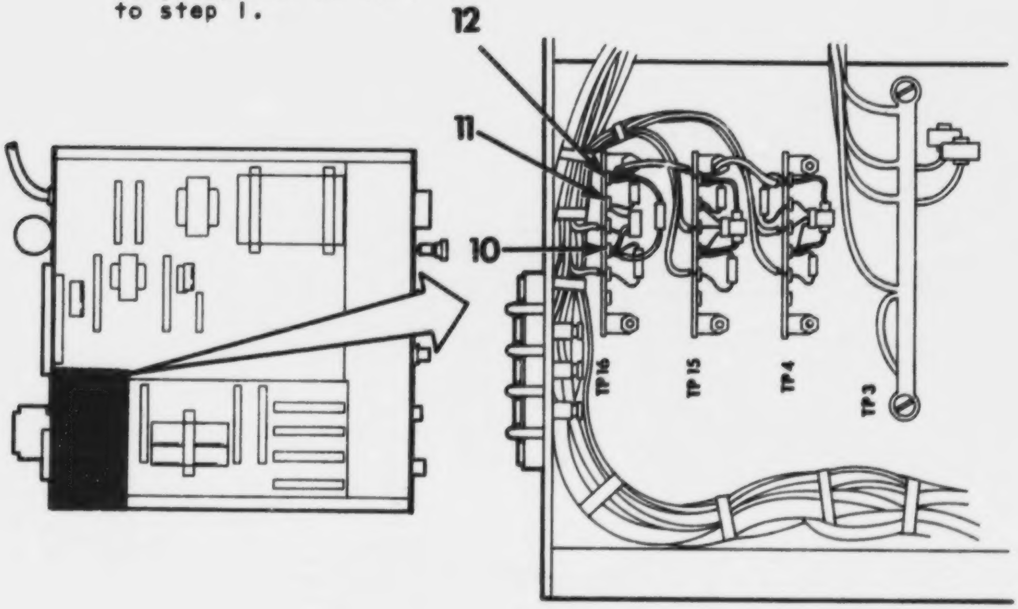
946. Check that VOM indicates less than 5 ohms. If not, replace S2 (6). Go to step 1.

947. Use VOM to measure OHMS. Connect positive test lead to transistor lead (11), common test lead to transistor lead (10).

948. Check that VOM indicates between 700 and 900 ohms. If not, go to step 970.

949. Use VOM to measure OHMS. Connect positive test lead to transistor lead (10), common test lead to transistor lead (11).

950. Check that VOM indicates between 1.1 and 1.3K ohms. If not, go to step 970.



951. Use VOM to measure OHMS. Connect positive test lead to transistor lead (3), common test lead to transistor lead (2).

952. Check that VOM indicates between 700 and 900 ohms. If not, replace transistor (8). Go to step 1.

953. Use VOM to measure OHMS. Connect positive test lead to transistor lead (2), common test lead to transistor lead (3).

954. Check that VOM indicates between 7 and 10K ohms. If not, replace transistor (8). Go to step 1.

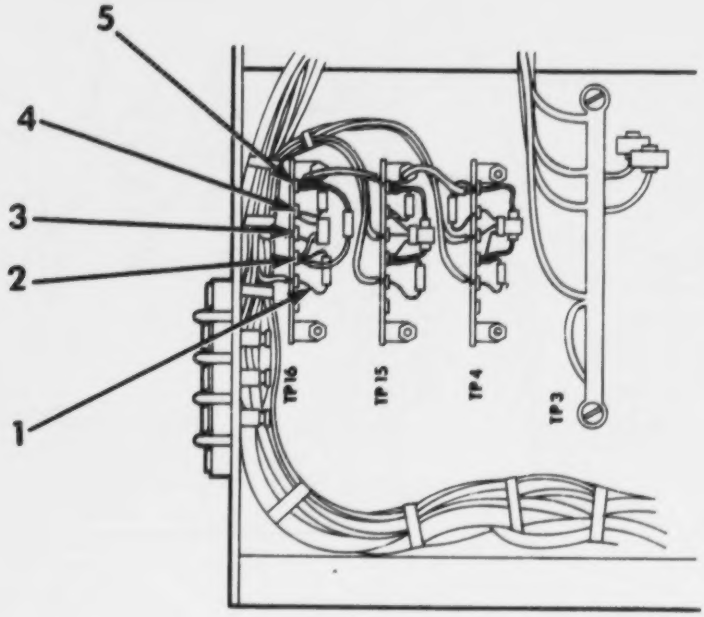
955. Use VOM to measure OHMS. Connect positive test lead to transistor lead (3), common test lead to transistor lead (4).

956. Check that VOM indicates more then 1K ohms. If not, replace transistor (8). Go to step 1.

957. Disconnect resistor lead (10) from TP16-1.

958. Use VOM to measure OHMS. Connect positive test lead to resistor lead (4), common test lead to resistor lead (10).

959. Check that VOM indicates between 19 and 21 ohms. If not, replace resistor (9). Go to step 1.



960. Reconnect resistor lead (10) to TP16-1.

961. Disconnect resistor lead (7) from TP16-4.

962. Use VOM to measure OHMS. Connect positive test lead to resistor lead (7), common test lead to resistor lead (5).

963. Check that VOM indicates between 1.1 and 1.3K ohms. If not, replace resistor (11). Go to step 1.

964. Reconnect resistor lead (7) to TP16-4.

965. Disconnect resistor lead (1) from TP16-5.

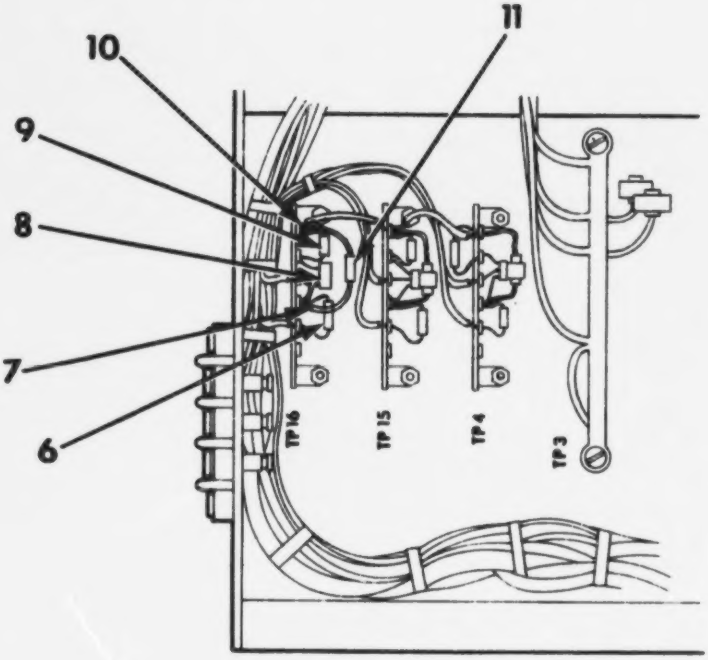
966. Use VOM to measure OHMS. Connect positive test lead to resistor lead (1), common test lead to resistor lead (2).

967. Check that VOM indicates between 6 and 6.5K ohms. If not, replace resistor (6). Go to step 1.

968. Reconnect resistor lead (1) to tP16-5.

969. Repair or replace wiring and connectors as necessary. Go to step 1.

970. Disconnect resistor lead (10) from TP16-1.



971. Use VOM to measure OHMS. Connect positive test lead to resistor lead (3), common test lead to resistor lead (8).

972. Check that VOM indicates between 19 and 21 ohms. If not, replace resistor (7). Go to step 979.

973. Reconnect resistor lead (8) to TP16-1.

974. Disconnect resistor lead (5) from TP16-4.

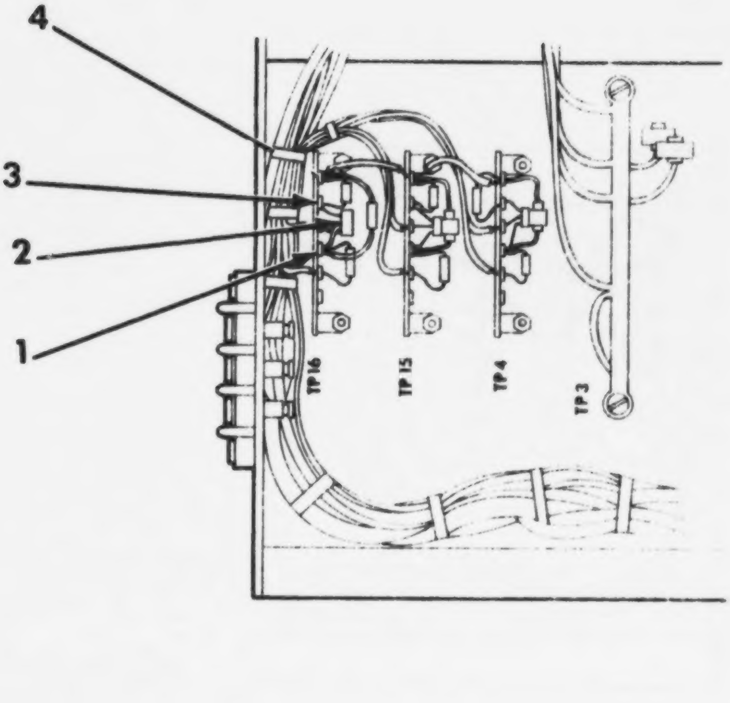
975. Use VOM to measure OHMS. Connect positive test lead to resistor lead (5), common test lead to resistor lead (4).

976. Check that VOM indicates between 1.1 and 1.3K ohms. If not, replace resistor (6). Go to step 983.

977. Reconnect resistor lead (5) to TP16-4.

978. Replace transistor (2). Go to step 1.

979. Disconnect resistor lead (5) from TP16-4.



980. Use VOM to measure OHMS. Connect positive test lead to resistor lead (5), common test lead to resistor lead (4).

981. Check that VOM indicates between 1.1 and 1.3K ohms. If not, replace resistor (6). Go to step 983.

982. Reconnect resistor lead (5) to TP16-4.

983. Use VOM to measure OHMS. Connect positive test lead to transistor lead (3), common test lead to transistor lead (1).

984. Check that VOM indicates between 700 and 900 ohms. If not, replace transistor (2). Go to step 1.

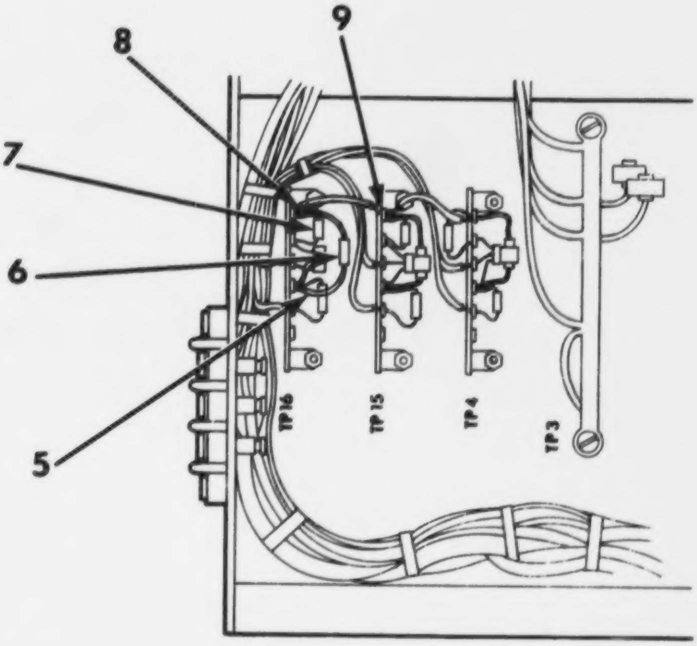
985. Use VOM to measure OHMS. Connect positive test lead to transistor lead (1), common test lead to transistor lead (3).

986. Check that VOM indicates between 1.1 and 1.3K ohms. If not, replace transistor (2). Go to step 1.

987. Go to step 1.

988. Use VOM to measure VDC. Connect positive test lead to TP15-1 (9), common test lead to ground.

989. Check that VOM indicates between 12 and 18 VDC. If not, repair or replace wiring and connectors as necessary; go to step 1.



990. Set the POWER switch to OFF.

991. Disconnect AC power from monitor.

992. Use VOM to measure OHMS. Connect positive test lead to S2A-1 (1), common test lead to S2A-C (3).

993. Check that VOM indicates less than 5 ohms. If not, replace S2 (2). Go to step 1.

994. Use VOM to measure OHMS. Connect positive test lead to transistor lead (8), common test lead to transistor lead (5).

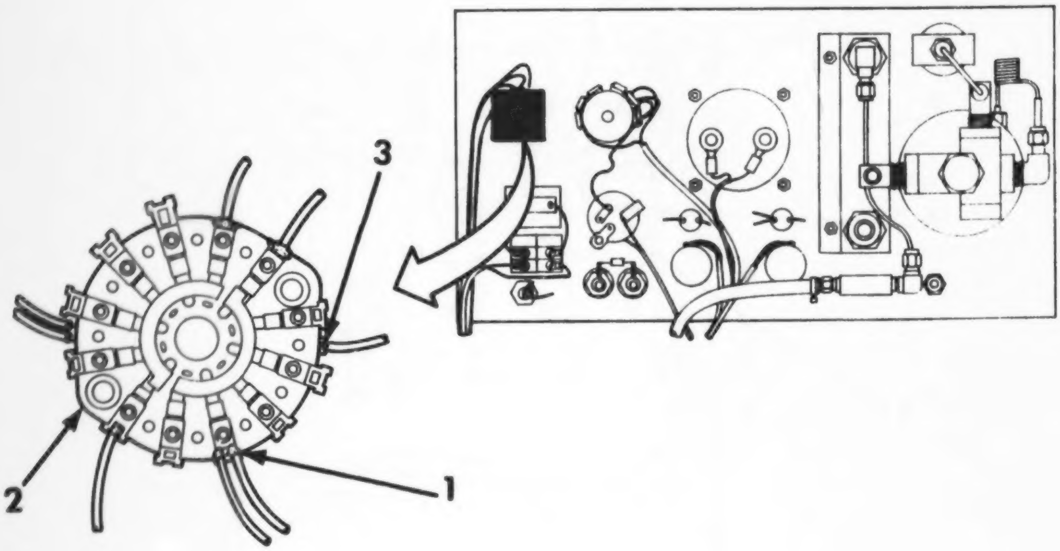
995. Check that VOM indicates between 700 and 900 ohms. If not, go to step 1017.

996. Use VOM to measure OHMS. Connect positive test lead to transistor lead (5), common test lead to transistor lead (8).

997. Check that VOM indicates between 1.1 and 1.3K ohms. If not, go to step 1017.

998. Use VOM to measure OHMS. Connect positive test lead to transistor lead (6), common test lead to transistor lead (5).

999. Check that VOM indicates between 700 and 900 ohms. If not, replace transistor (12). Go to step 1.



1000. Use VOM to measure OHMS. Connect positive test lead to transistor lead (5), common test lead to transistor lead (6).

1001. Check that VOM indicates between 7 and 10K ohms. If not, replace transistor (12). Go to step 1.

1002. Use VOM to measure OHMS. Connect positive test lead to transistor lead (6), common test lead to transistor lead (8).

1003. Check that VOM indicates more than 1K ohms. If not, replace transistor (7). Go to step 1.

1004. Disconnect resistor lead (10) from TP15-1.

1005. Use VOM to measure OHMS. Connect positive test lead to resistor lead (8), common test lead to resistor lead (10).

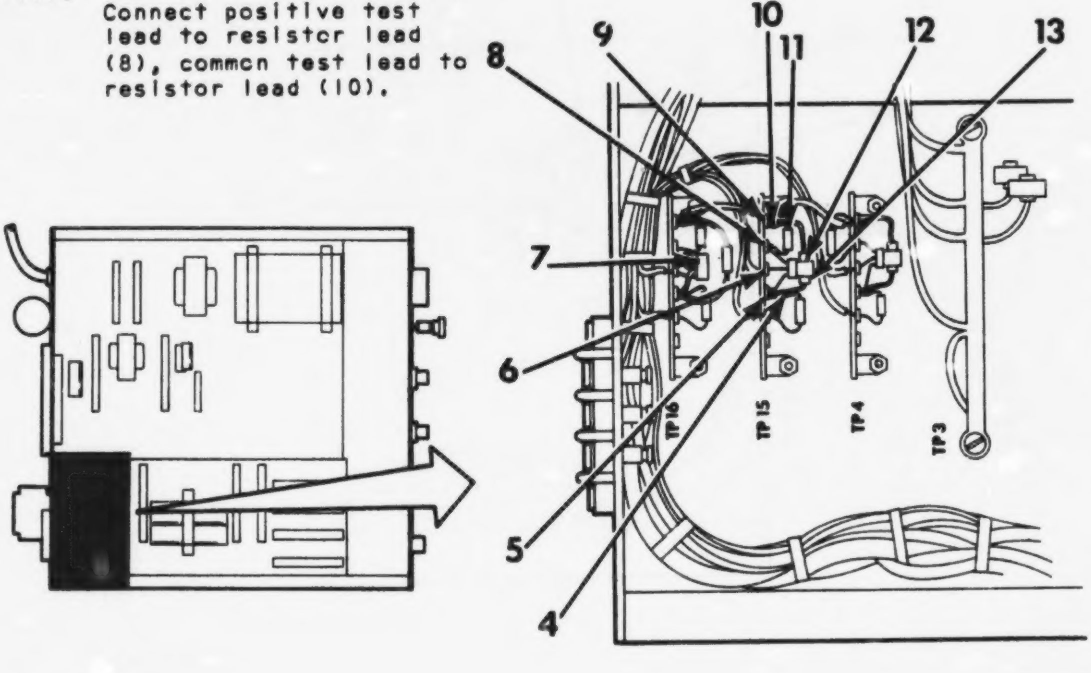
1006. Check that VOM indicates between 19 and 21 ohms. If not, replace resistor (11). Go to step 1.

1007. Reconnect resistor lead (10) to TP15-1.

1008. Disconnect resistor lead (4) from TP15-4.

1009. Use VOM to measure OHMS. Connect positive test lead to resistor lead (4), common test lead to resistor lead (9).

1010. Check that VOM indicates between 1.1 and 1.3K ohms. If not, replace resistor (13). Go to step 1.



1011. Reconnect resistor lead (9) to TP15-4.

1012. Disconnect resistor lead (7) from TP15-5.

1013. Use VOM to measure OHMS. Connect positive test lead to resistor lead (7), common test lead to resistor lead (2).

1014. Check that VOM indicates between 6 and 6.5K ohms. If not, replace resistor (6). Go to step 1.

1015. Reconnect resistor lead (7) to TP15-5.

1016. Repair or replace wiring and connectors as necessary. Go to step 1.

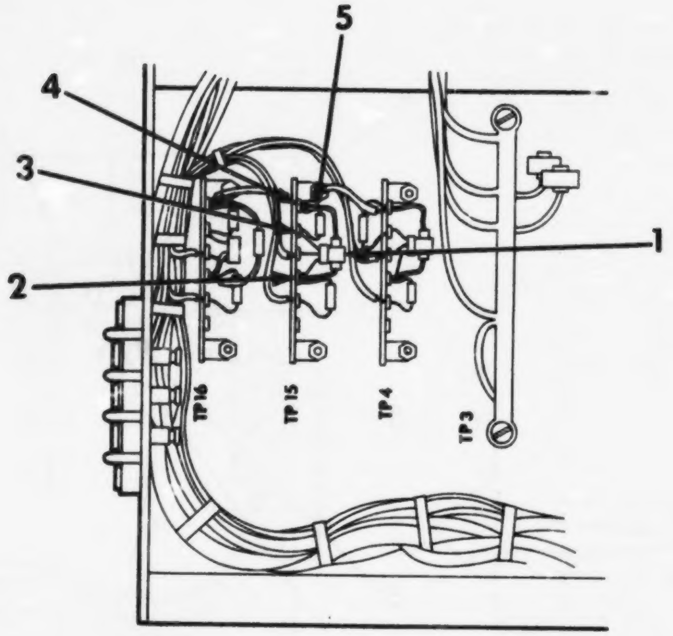
1017. Disconnect resistor lead (5) from TP15-1.

1018. Use VOM to measure OHMS. Connect positive test lead to resistor lead (3), common test lead to resistor lead (5).

1019. Check that VOM indicates between 19 and 21 ohms. If not, go to step 1026.

1020. Reconnect resistor lead (5) to TP15-1.

1021. Disconnect resistor lead (9) from TP15-4.



1022. Use VOM to measure OHMS. Connect positive test lead to resistor lead (9), common test lead to resistor lead (4).

1023. Check that VOM indicates between 1.1 and 1.3K ohms. If not, go to step 1030.

1024. Reconnect resistor lead (9) to TP15-4.

1025. Replace transistor (1). Go to step 1.

1026. Disconnect resistor lead (9) from TP15-4.

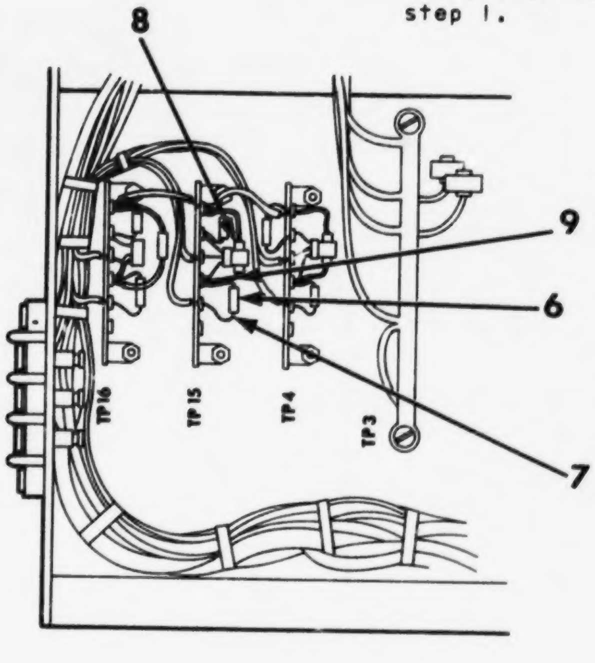
1027. Use VOM to measure OHMS. Connect positive test lead to resistor lead (9), common test lead to resistor lead (4).

1028. Check that VOM indicates between 1.1 and 1.3K ohms. If not, replace resistor (8). Go to step 1.

1029. Reconnect resistor lead (9) to TP15-4.

1030. Use VOM to measure OHMS. Connect positive test lead to transistor lead (3), common test lead to transistor lead (2).

1031. Check that VOM indicates between 700 and 900 ohms. If not, replace transistor (1). Go to step 1.



1032. Use VOM to measure OHMS. Connect positive test lead to transistor lead (3), common test lead to transistor lead (4).

1033. Check that VOM indicates between 1.1 and 1.3K ohms. If not, replace transistor (1). Go to step 1.

1034. Go to step 1.

1035. Set the POWER switch to OFF.

1036. Disconnect AC power from monitor.

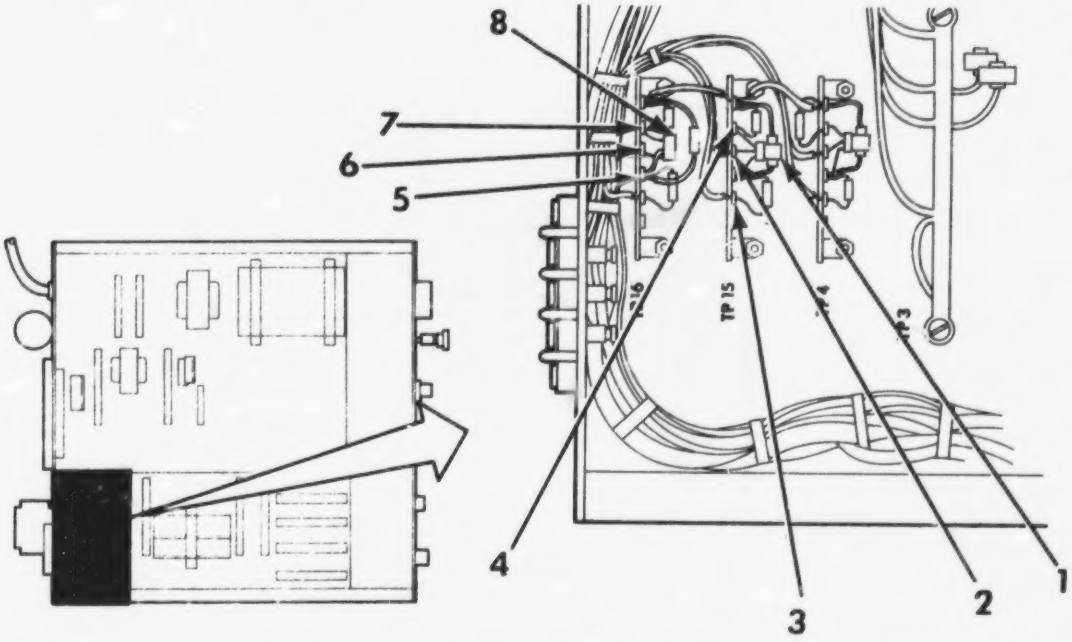
1037. Use VOM to measure OHMS. Connect positive test lead to TP16-4 (5), common test lead to ground.

1038. Check that VOM indicates more than 1.1K ohms. If not, go to step 1043.

1039. Set MODE SELECTOR (9) to CALIBRATE.

1040. Use VOM to measure OHMS. Connect positive test lead to TP16-2 (7), common test lead to TP16-3 (6).

1041. Check that VOM indicates more than 50K ohms. If not, replace transistor (8). Go to step 1.



1042. Repair or replace wiring and connectors as necessary. Go to step 1.

1043. Disconnect transistor lead (5) from TP16-4.

1044. Use VOM to measure OHMS. Connect positive test lead to TP16-4 (5), common test lead to ground.

1045. Check that VOM indicates more than 1.1K ohms. If not, repair or replace wiring and connectors as necessary; go to step 1.

1046. Replace transistor (8). Go to step 1.

1047. Set the POWER switch to OFF.

1048. Disconnect AC power from monitor.

1049. Use VOM to measure OHMS. Connect positive test lead to TP15-4 (3), common test lead to ground.

1050. Check that VOM indicates more than 1.1K ohms. If not, go to step 1055.

1051. Set MODE SELECTOR (9) to CALIBRATE.

1052. Use VOM to measure OHMS. Connect positive test lead to TP15-2 (4), common test lead to TP15-3 (2).

1053. Check that VOM indicates more than 50K ohms. If not, replace transistor (1). Go to step 1.

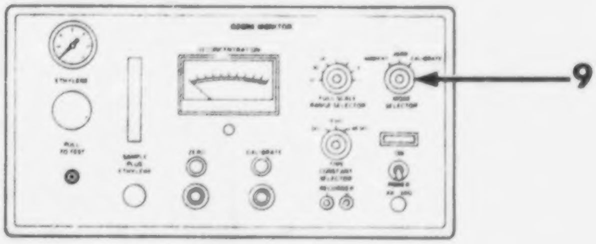
1054. Repair or replace wiring and connectors as necessary. Go to step 1.

1055. Disconnect transistor lead (3) from TP15-4.

1056. Use VOM to measure OHMS. Connect positive test lead to TP15-4 (3), common test lead to ground.

1057. Check that VOM indicates more than 1.1K ohms. If not, repair or replace wiring and connectors as necessary; go to step 1.

1058. Replace transistor (1). Go to step 1.



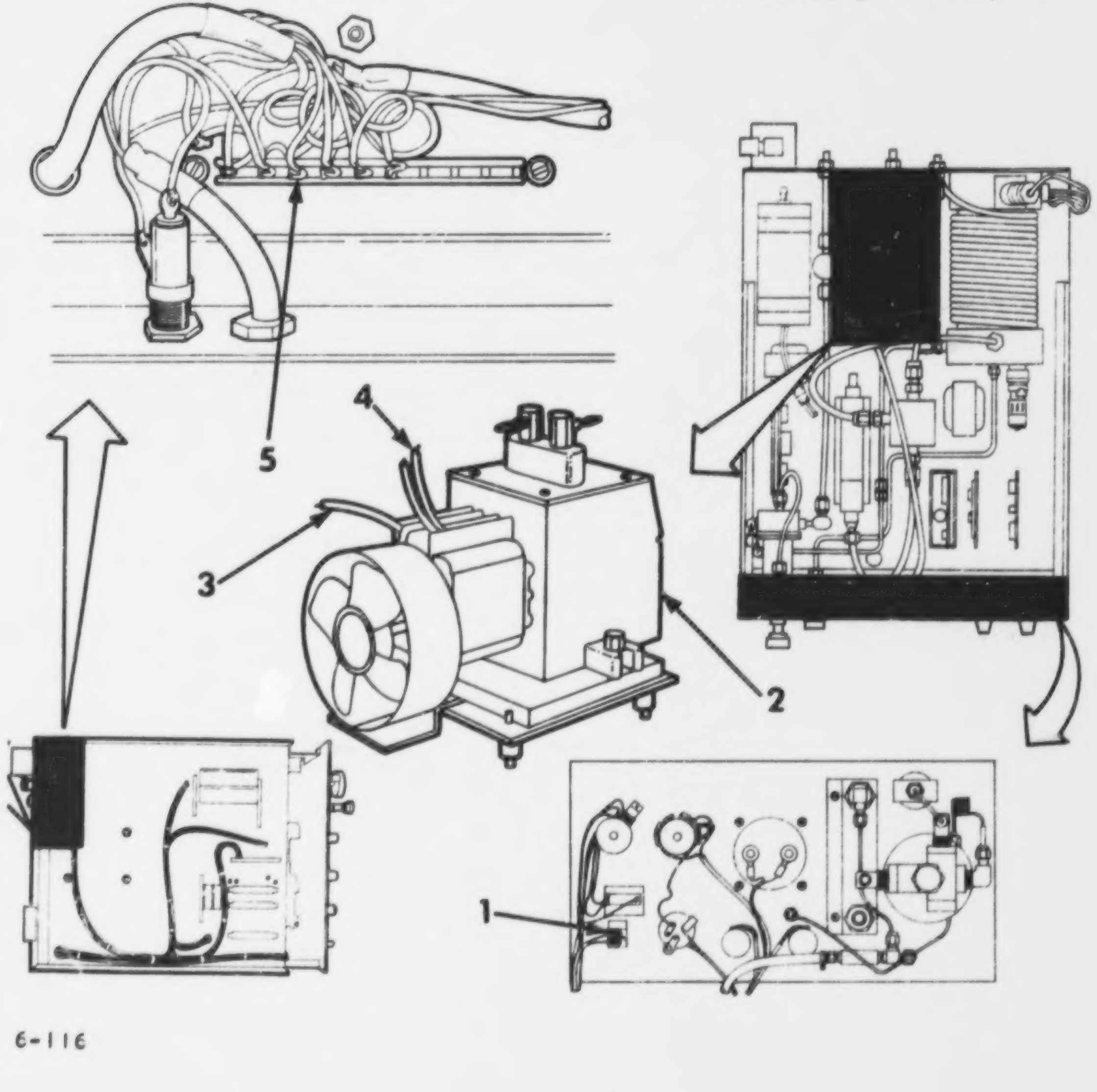
1059. If you are servicing a MOD C monitor, go to step 1068. If not, go to next step.

1060. Set the POWER switch to OFF.

1061. Disconnect AC power from monitor.

1062. Use VOM to measure OHMS. Connect positive test lead to POWER switch (1), common test lead to inside wire nut with one white and one black wire (4).

1063. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1.



1064. Use VOM to measure OHMS. Connect positive test lead to TP1 (5), common test lead to inside wire nut with one white and two black wires (3).

1065. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1.

1066. Replace pump assembly (2), refer to page 7-1.

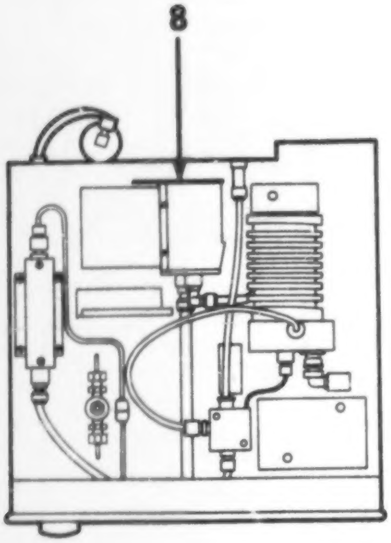
1067. Go to step 1.

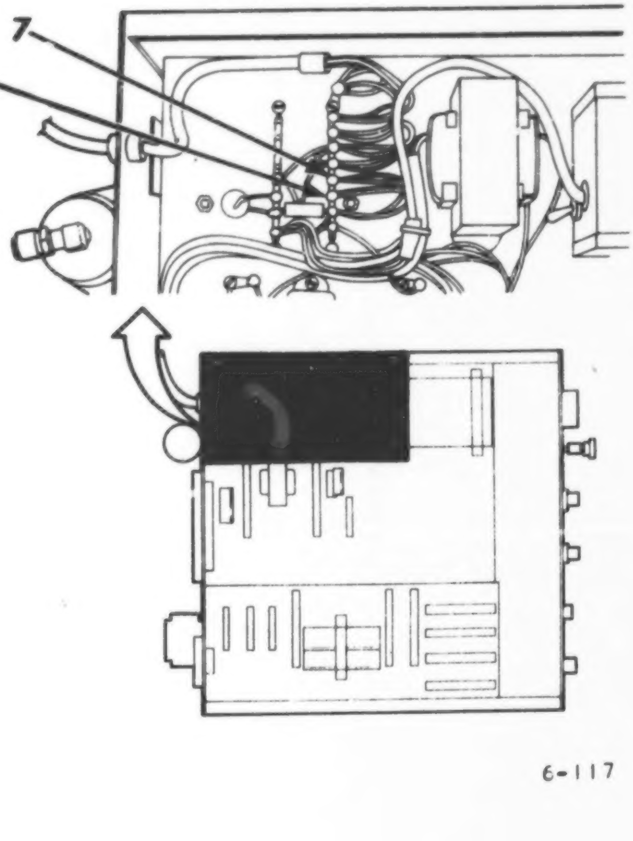
1068. Use VOM to measure VAC. Connect positive test lead to TP1-5 (7), common test lead to ground.

1069. Check that VOM indicates between 100 and 125 VAC. If not, repair or replace wiring and connectors as necessary; go to step 1.

1070. Use VOM to measure VAC. Connect positive test lead to TP1-6 (6), common test lead to ground.

1071. Check that VOM indicates between 100 and 125 VAC. If not, replace pump assembly (8). Go to step 1.





1072. Use VOM to measure VAC. Connect positive test lead to TP1-7 (1), common test lead to ground.

1073. Check that VOM indicates between 100 and 125 VAC. If not, repair or replace wiring and connectors as necessary; go to step 1.

1074. Set the POWER switch to OFF.

1075. Disconnect AC power from monitor.

1076. Replace pump assembly (2), refer to page 7-1.

1077. Go to step 1.

1078. If you are servicing a MOD C monitor, go to step 1101. If not, go to next step.

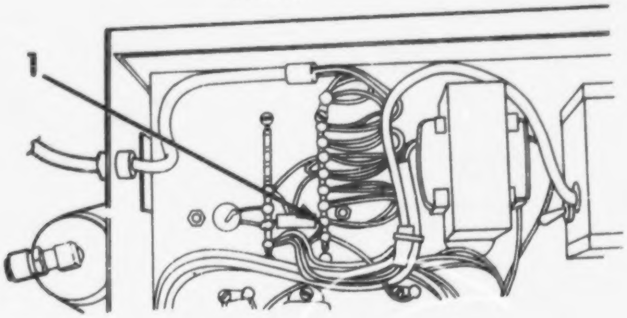
1079. Set the POWER switch to OFF.

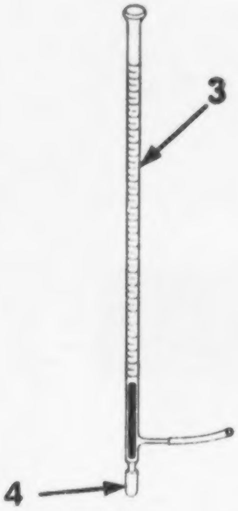
CAUTION

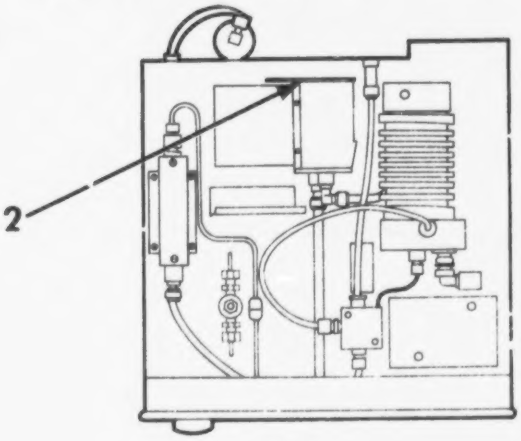
Use extreme caution when connecting or disconnecting capillary tube fittings. The capillary tube is easily damaged.

1080. Disconnect fitting (5) from ethylene regulator.

1081. Connect bubblemeter kit (3) to end of capillary tube.







1082. Set the POWER switch to ON.

NOTE

The following step requires timing. Begin timing when bubble forms.

1083. Momentarily depress bulb (4) on bubblemeter until bubble forms, then time for one minute.

1084. Check that flowmeter (3) indicates approximately 25 cc/min ethylene flow. If not, go to step 1086.

1085. Replace diverter valve (8). Go to step 1.

1086. Set the POWER switch to OFF.

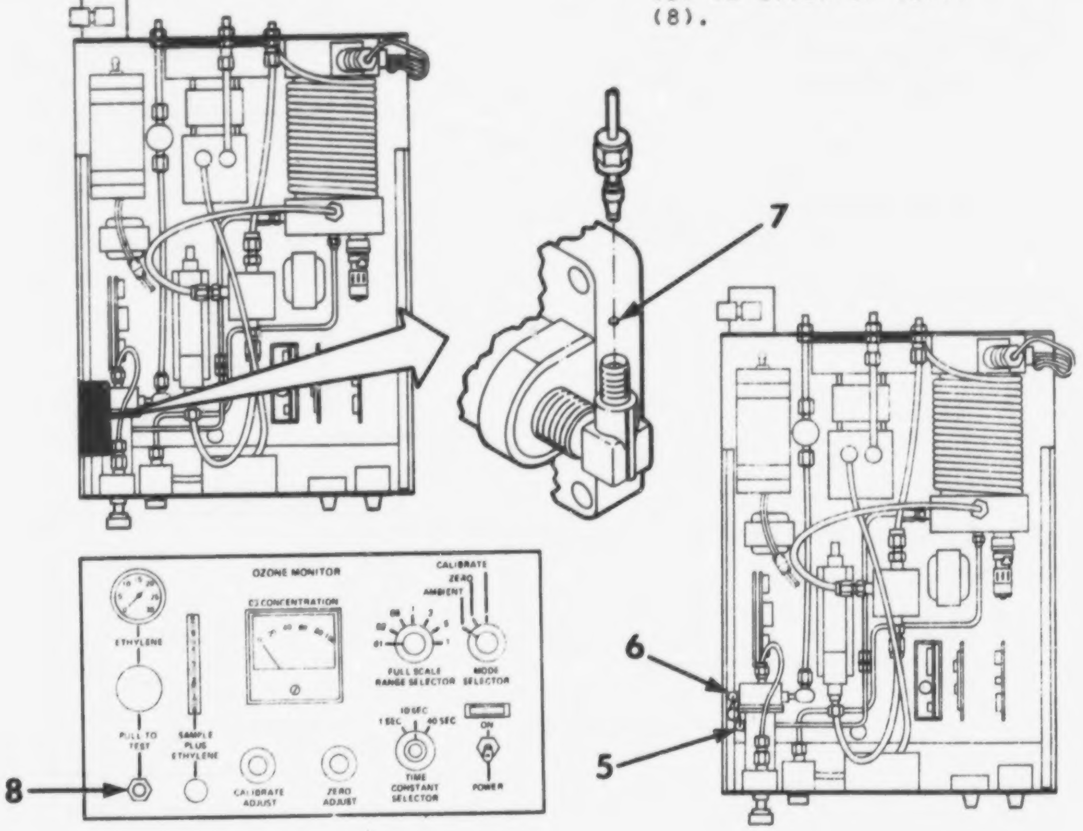
1087. Reconnect fitting to ethylene regulator.

1088. Disconnect fitting (6) from ethylene regulator.

1089. Interchange sintered filter (7) with a new one.

1090. Reconnect fitting to ethylene regulator.

1091. Connect bubblemeter kit (3) to diverter valve (8).


7
6
5
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
FULL SCALE RANGE SELECTOR
MODE SELECTOR
CALIBRATE
ZERO
AMBIENT
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
8

1092. Set the POWER switch to ON.

1093. Adjust ethylene regulator to pressure specified on Supplied Data Sheet.

1094. Connect bubblemeter tubing (2) to diverter valve (4).

NOTE

MOD A diverter valve is located on Ethylene Flow Box.

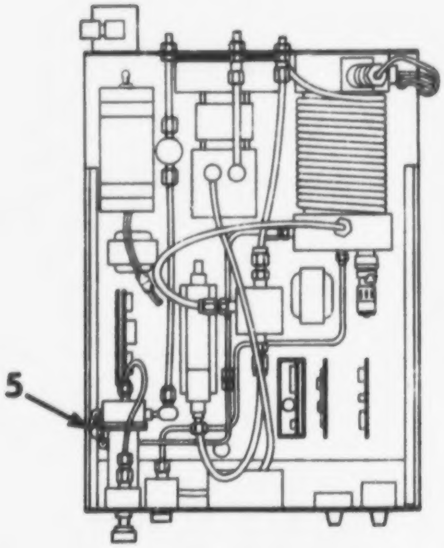
1095. Pull diverter valve (4) outward.

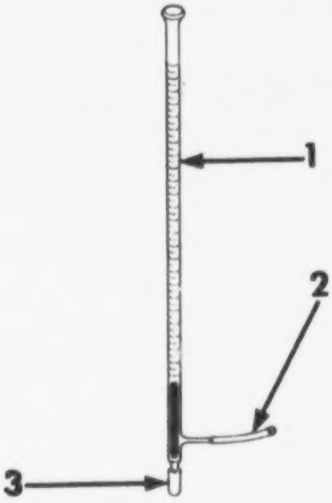
1096. Momentarily depress rubber bulb (3) on bublemeter until bubble forms inside tube.

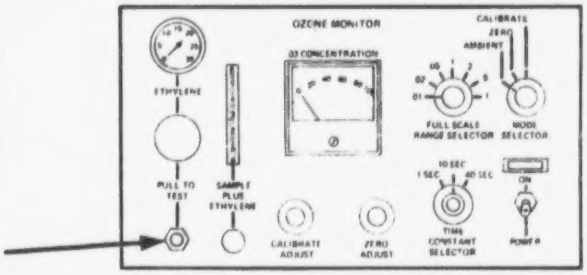
1097. Depress and hold diverter valve (4) when bubble reaches 0 on bubblemeter scale.

NOTE

The following step requires timing. Start and stop ethylene flow and stopwatch at the same time.






4
OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE ADJUST
ZERO ADJUST
FULL SCALE RANGE SELECTOR
MODE SELECTOR
CALIBRATE
ZERO
AMBIENT
10 SEC
1 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER

1098. Pull diverter valve (4) outward and time for one minute. Depress diverter valve (4). Observe height in centimeters reached by bubble.

1099. Check that indicated flow rate is 25 cc/min or more. If not, replace capillary tube (5). Go to step 1.

1100. Go to step 1.

1101. Set the POWER switch to OFF.

CAUTION

Use extreme caution when connecting or disconnecting capillary tube fittings. The capillary tube is easily damaged.

1102. Disconnect fitting (6) from ethylene regulator.

1103. Connect bubblemeter kit (1) to end of capillary tube.

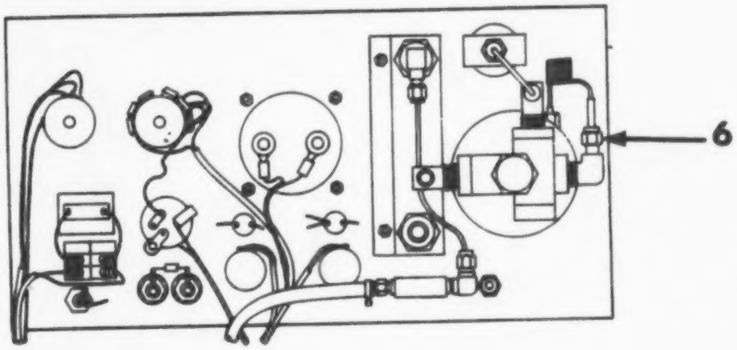
1104. Set the POWER switch to ON.

NOTE

The following step requires timing. Begin timing when bubble forms.

1105. Momentarily depress bulb (3) on bubblemeter until bubble forms, then time for one minute.

1106. Check that flowmeter (1) indicates approximately 25 cc/min ethylene flow. If not, go to step 1108.



1107. Replace diverter valve (1). Go to step 1.

1108. Set the POWER switch to OFF.

1109. Reconnect fitting to ethylene regulator.

1110. Disconnect fitting (4) from ethylene regulator.

1111. Interchange sintered filter (2) with a new one.

1112. Reconnect fitting to ethylene regulator.

1113. Connect bubblemeter kit (7) to diverter valve (1).

1114. Set the POWER switch to ON.

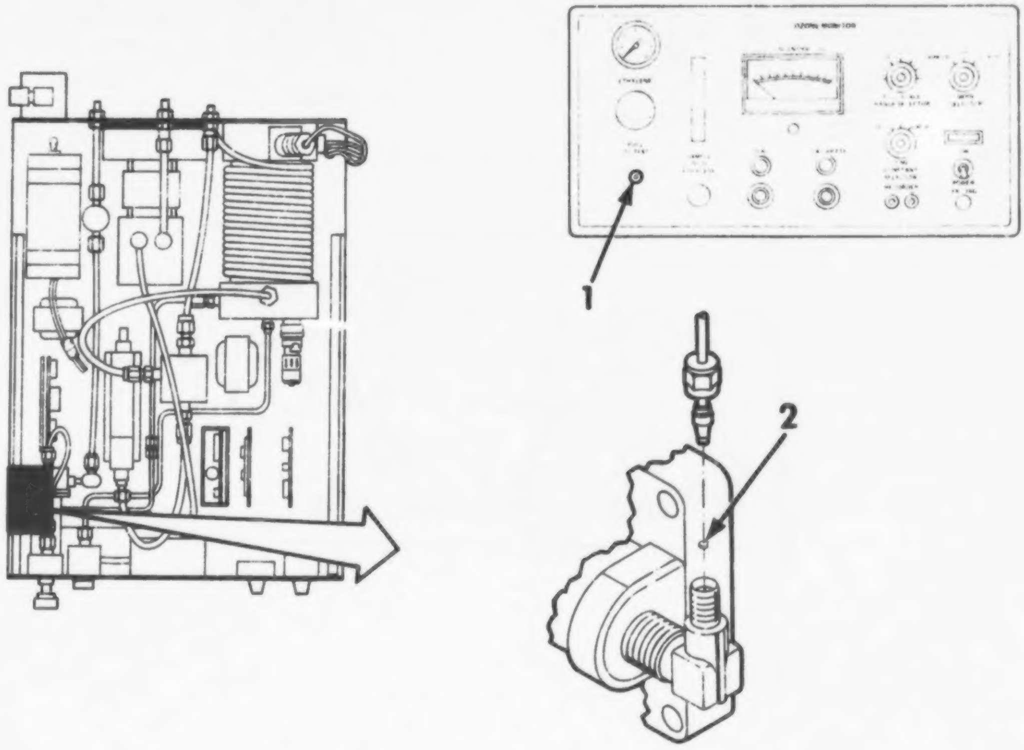
1115. Adjust ethylene regulator to pressure specified on Supplied Data Sheet.

1116. Connect bubblemeter tubing (8) to diverter valve (1).

NOTE

MOD A diverter valve is located on Ethylene Flow Box.

1117. Pull diverter valve (1) outward.



1118. Momentarily depress rubber bulb (9) on bublemeter until bubble forms inside tube.

1119. Depress and hold diverter valve (1) when bubble reaches 0 on bubblemeter scale.

NOTE

The following step requires timing. Start and stop ethylene flow and stopwatch at the same time.

1120. Pull diverter valve (1) outward and time for one minute. Depress diverter valve (1). Observe height in centimeters reached by bubble.

1121. Check that indicated flow rate is 25 cc/min or more. If not, replace capillary tube (3). Go to step 1.

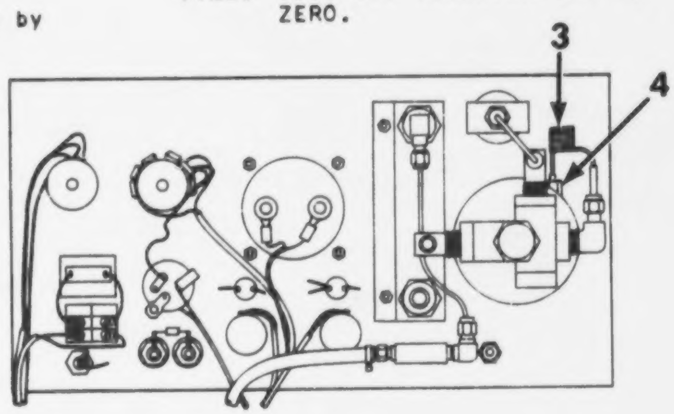
1122. Go to step 1.

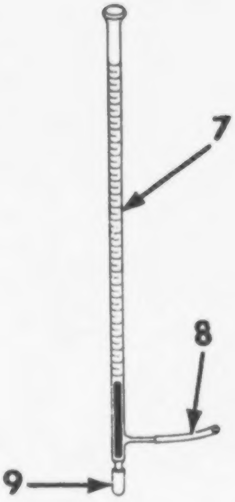
1123. If you are servicing a MOD-C monitor, go to step 1169. If not, go to next step.

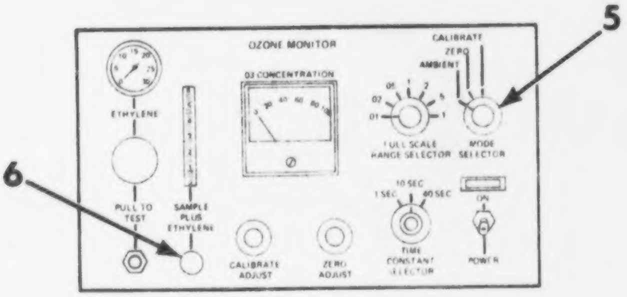
1124. Set MODE SELECTOR (5) to AMBIENT.

1125. Adjust SAMPLE PLUS EHTYLENE flowmeter (6) to value specified on Supplied Data Sheet. If not, go to step 1129.

1126. Set MODE SELECTOR (5) to ZERO.






5
6
OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER

1127. Adjust SAMPLE PLUS EHTYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, go to step 1138.

1128. Go to step 1.

1129. Set MODE SELECTOR (2) to ZERO.

1130. Adjust SAMPLE PLUS EHTYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, go to step 1143.

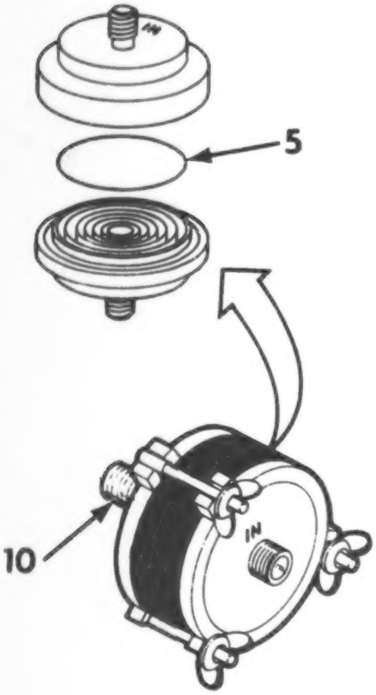
1131. Set MODE SELECTOR (2) to AMBIENT.

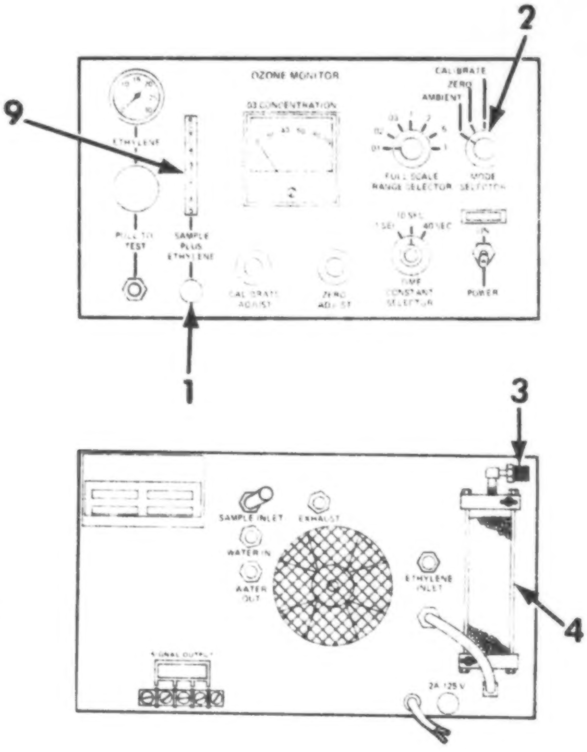
1132. Disconnect Sample Filter (10) from Sample in fitting.

1133. Seal off air flow at Sample in fitting (8).

1134. Check the SAMPLE PLUS ETHYLENE flowmeter (9) slowly decreases to 0. If not, refer to Check Sample and Calibration Sample Flow Paths; page 7-29.

1135. Replace sample filter element (5), refer to Inspect and Service the Sample Filter; page 5-5.




2
OZONE MONITOR
CALIBRATE
ZERO
AMBIENT
9
ETHYLENE
O3 CONCENTRATION
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
ON
POWER
1
3
SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
4
SIGNAL OUTPUT
2A 125 V

1136. Adjust SAMPLE PLUS ETHYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, replace plumbing as necessary. Go to step 1.

1137. Go to step 1.

1138. Seal off air flow at Calibration Sample Inlet (3).

1139. Check the SAMPLE PLUS ETHYLENE flowmeter (9) slowly decreases to 0. If not, refer to Check Sample and Calibration Sample Flow Paths; page 7-29.

1140. Replace Calibration Sample Filter (4), refer to Inspect and Service the Calibration Sample Filter; page 5-1

1141. Adjust SAMPLE PLUS ETHYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, replace plumbing as necessary. Go to step 1.

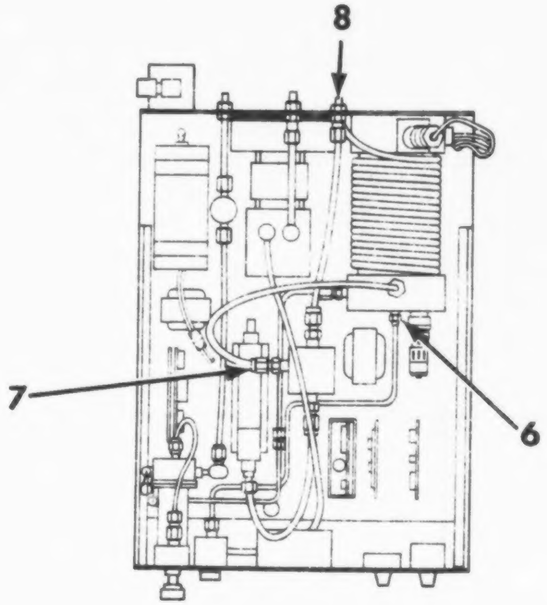
1142. Go to step 1.

1143. Disconnect exhaust fitting (6) from detector cell.

1144. Adjust SAMPLE PLUS EHTYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, go to step 1151.

1145. Reconnect exhaust fitting to detector cell.

1146. Disconnect COMM fitting (7) from solenoid valve.



1147. Adjust SAMPLE PLUS EHTYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, go to step 1155.

1148. Replace Selector Solenoid Valve (4).

1149. Adjust SAMPLE PLUS ETHYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, replace plumbing as necessary. Go to step 1.

1150. Go to step 1.

1151. Reconnect exhaust fitting to detector cell.

1152. Interchange SAMPLE PLUS ETHYLENE flowmeter (5) with a new one.

1153. Adjust SAMPLE PLUS EHTYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, go to step 1159.

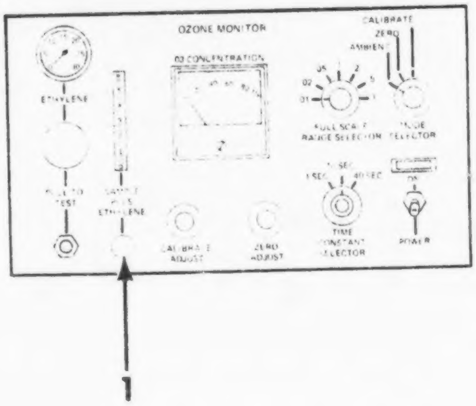
1154. Go to step 1.

1155. Reconnect COMM fitting to solenoid valve.

1156. Replace Detector Cell (3), refer to Replace Detector Cell Assembly; page 7-21.

1157. Adjust SAMPLE PLUS ETHYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, replace plumbing as necessary. Go to Step 1.

1158. Go to step 1.


OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE ADJUST
ZERO ADJUST
.01
.02
.04
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
1

1159. Remove new SAMPLE PLUS ETHYLENE flowmeter (5) from monitor, reinstall old flowmeter.

1160. Check pump reed valve assembly, refer to Clean Reed Valve Assembly.

1161. Adjust SAMPLE PLUS EHTYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, go to step 1163.

1162. Go to step 1.

1163. Interchange pump assembly (2) with a new one. Refer to Replace Pump Assembly.

1164. Adjust SAMPLE PLUS EHTYLENE flowmeter (1) to value specified on Supplied Data Sheet. If not, go to step 1166.

1165. Go to step 1.

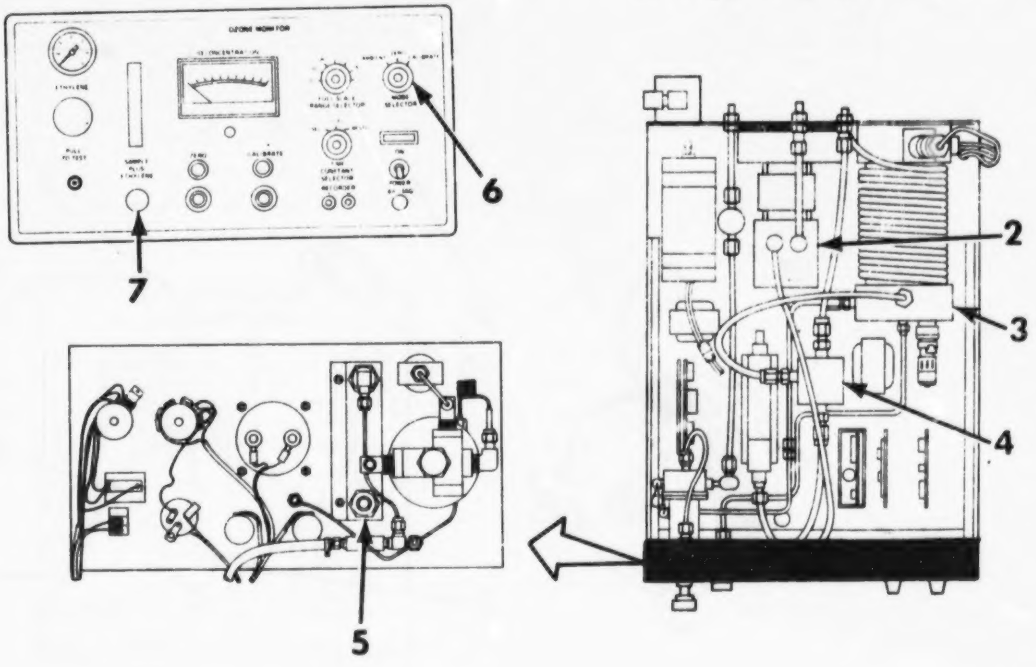
1166. Remove new pump assembly (2) from monitor, reinstall old pump assembly.

1167. Replace plumbing as necessary.

1168. Go to step 1.

1169. Set MODE SELECTOR (6) to AMBIENT.

1170. Adjust SAMPLE PLUS EHTYLENE flowmeter (7) to value specified on Supplied Data Sheet. If not, go to step 1174.



1171. Set MODE SELECTOR (1) to ZERO.

1172. Adjust SAMPLE PLUS EHTYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, go to step 1183.

1173. Go to step 1.

1174. Set MODE SELECTOR (1) to ZERO.

1175. Adjust SAMPLE PLUS EHTYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, go to step 1188.

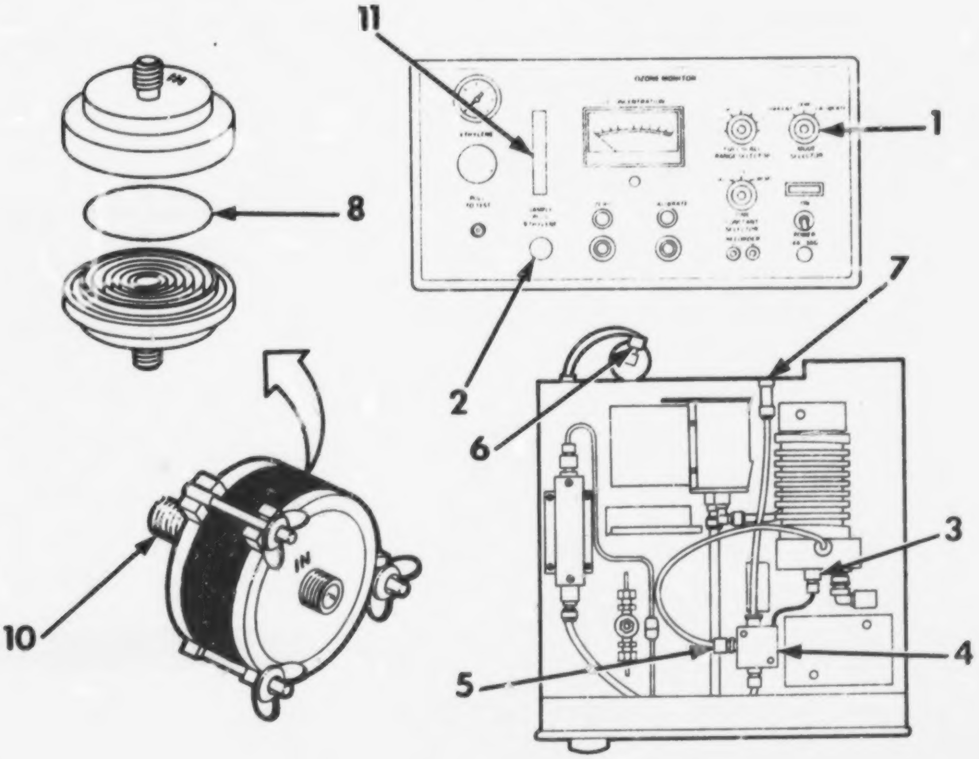
1176. Set MODE SELECTOR (1) to AMBIENT.

1177. Disconnect Sample Filter (10) from SAMPLE IN fitting.

1178. Seal off air flow at SAMPLE IN fitting (7).

1179. Check the SAMPLE PLUS ETHYLENE flowmeter (11) slowly decreases to 0. If not, refer to Check Sample and Calibration Sample Flow Paths; page 7-29.

1180. Replace sample filter element (8), refer to Inspect and Service the Sample Filter; page 5-5.



1181. Adjust SAMPLE PLUS ETHYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, replace plumbing as necessary. Go to step 1.

1182. Go to step 1.

1183. Seal off air flow at Calibration Sample Inlet (6).

1184. Check the SAMPLE PLUS ETHYLENE flowmeter (11) slowly decreases to 0. If not, refer to Check Sample and Calibration Sample Flow Paths; page 7-29.

1185. Replace Calibration Sample Filter (9), refer to Inspect and Service the Calibration Sample Filter; page 5-1.

1186. Adjust SAMPLE PLUS ETHYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, replace plumbing as necessary. Go to step 1.

1187. Go to step 1.

1188. Disconnect exhaust fitting (3) from detector cell.

1189. Adjust SAMPLE PLUS EHTYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, go to step 1196.

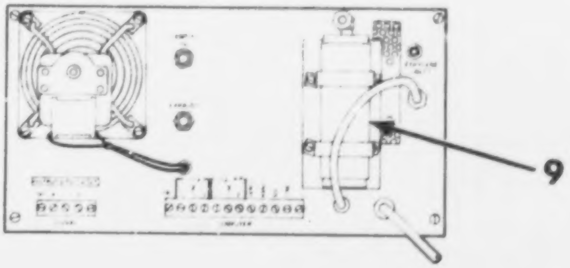
1190. Reconnect exhaust fitting to detector cell.

1191. Disconnect COMM fitting (5) from solenoid valve.

1192. Adjust SAMPLE PLUS EHTYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, go to step 1200.

1193. Replace Selector Solenoid Valve (4).

1194. Adjust SAMPLE PLUS ETHYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, replace plumbing as necessary. Go to step 1.



1195. Go to step 1.

1196. Reconnect exhaust fitting to detector cell.

1197. Interchange SAMPLE PLUS ETHYLENE flowmeter (1) with a new one.

1198. Adjust SAMPLE PLUS EHTYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, go to step 1204.

1199. Go to step 1.

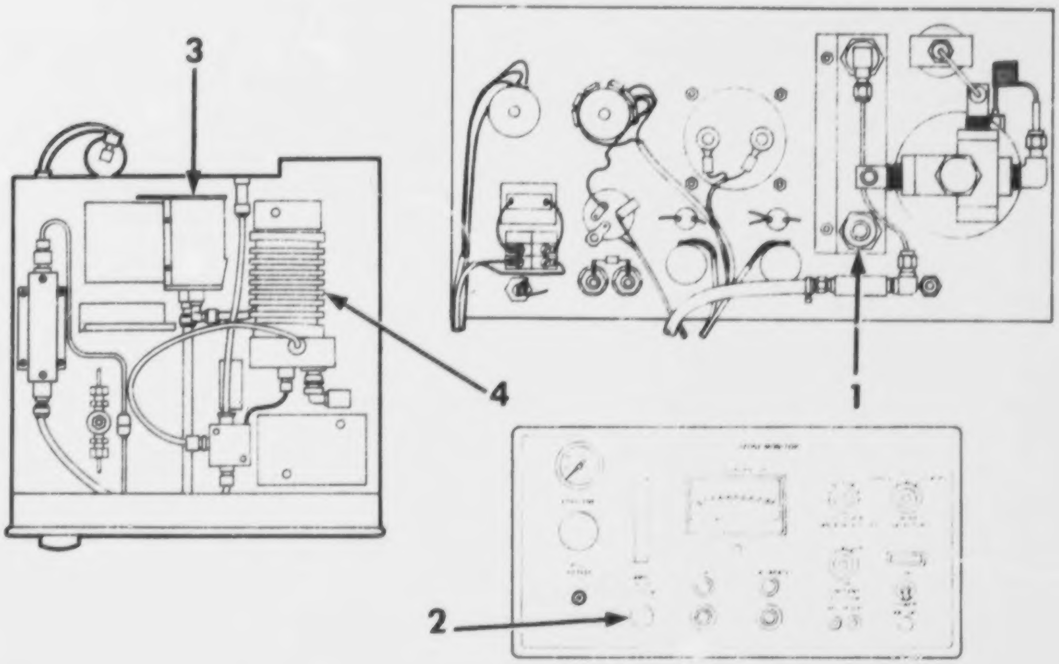
1200. Reconnect COMM fitting to solenoid valve.

1201. Replace detector cell (4), refer to Replace Detector Cell Assembly; page page 7-21

1202. Adjust SAMPLE PLUS ETHYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, replace plumbing as necessary. Go to Step 1.

1203. Go to step 1.

1204. Remove new SAMPLE PLUS ETHYLENE flowmeter (1) from monitor, reinstall old flowmeter.



1205. Check pump reed valve assembly, refer to Clean Reed Valve Assembly.

1206. Adjust SAMPLE PLUS EHTYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, go to step 1208.

1207. Go to step 1.

1208. Interchange pump assembly (3) with a new one. Refer to Replace Pump Assembly.

1209. Adjust SAMPLE PLUS EHTYLENE flowmeter (2) to value specified on Supplied Data Sheet. If not, go to step 1211.

1210. Go to step 1.

1211. Remove new pump assembly (3) from monitor, reinstall old pump assembly.

1212. Replace plumbing as necessary.

1213. Go to step 1.

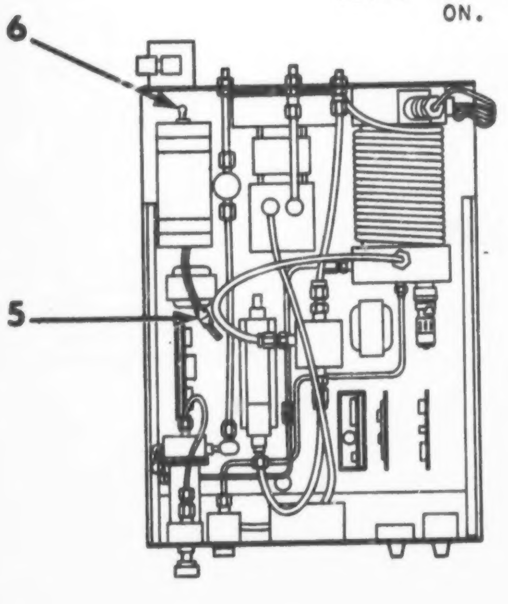
1214. If you are servicing a MOD C monitor, go to step 1260. If not, go to next step.

1215. Insure Power Supply switch (6) is set to ON. If not, set switch (6) to ON and go to step 1.

1216. Set the POWER switch to OFF.

1217. Disconnect plug (5).

1218. Set the POWER switch to ON.



CAUTION

High voltage may be present on plug terminals. Use caution when connecting test leads.

1219. Use VOM to measure VAC. Connect positive test lead to plug (4), common test lead to plug (3).

1220. Check that VOM indicates 800 VAC or more. If not, go to step 1230.

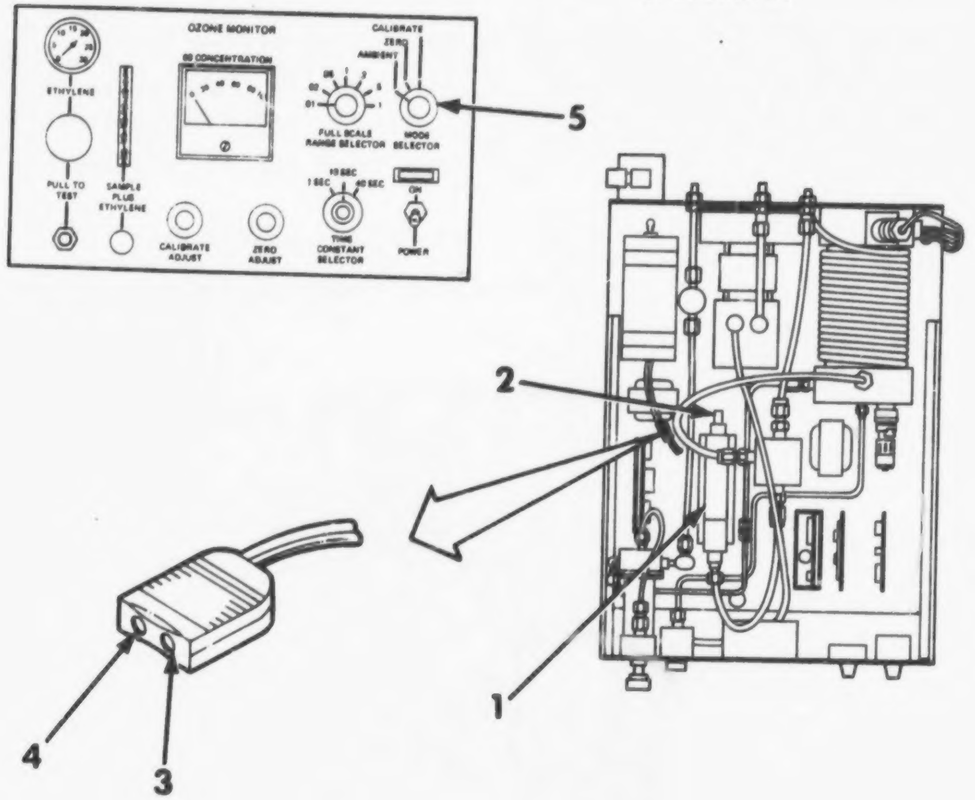
1221. Set the POWER switch to OFF.

1222. Reconnect plug.

1223. Remove ultraviolet lamp (2).

1224. Set the POWER switch to ON.

1225. Set MODE SELECTOR (5) to CALIBRATE.


OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
5
2
1
4
3

1226. Check that ultraviolet lamp is lit. If not, go to step 1239.

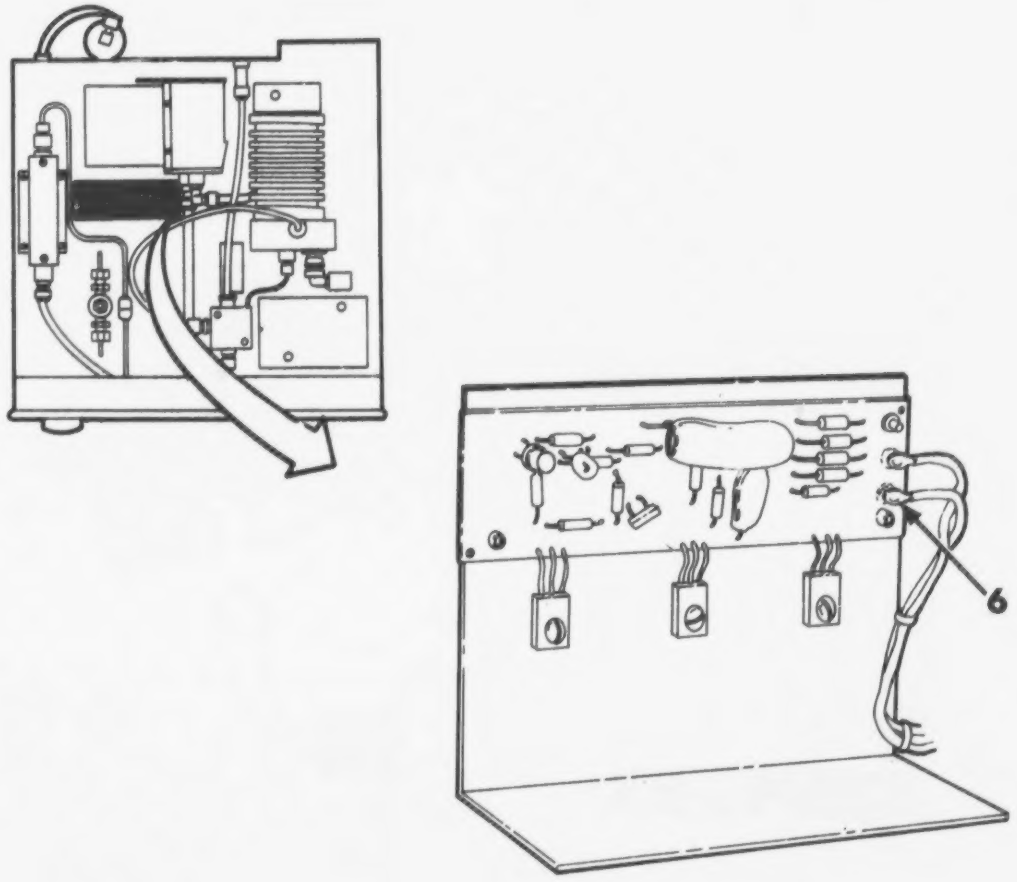
1227. Set the POWER switch to OFF.

1228. Disconnect AC power from monitor.

1229. Replace Ozone Generator (1). Go to step 1.

1230. Use VOM to measure VAC. Connect positive test lead to AC Current Regulator OUT (6), common test lead to ground.

1231. Check that VOM indicates between 30 and 40 VAC. If not, go to step 1243.



1232. Set the POWER switch to OFF.

1233. Disconnect AC power from monitor.

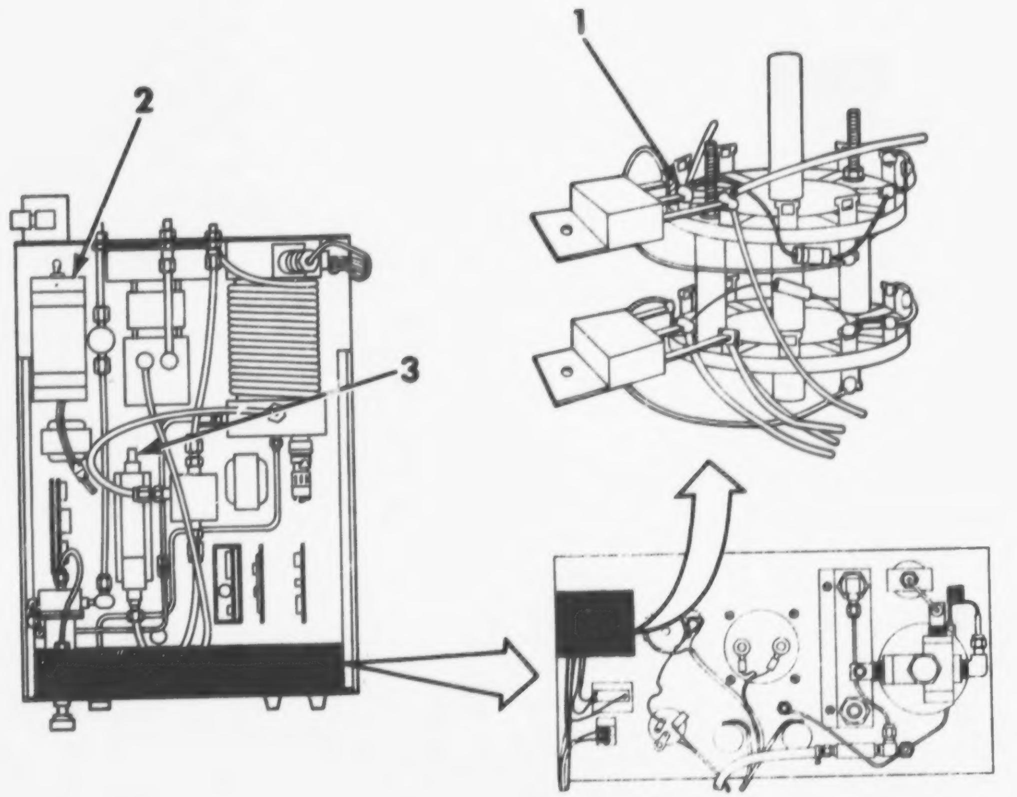
1234. Use VOM to measure OHMS. Connect positive test lead to TP1 (7), common test lead to AC Current Regulator OUT (5).

1235. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1303.

1236. Use VOM to measure OHMS. Connect positive test lead to TP1 (6), common test lead to AC Current Regulator COM (4).

1237. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1303.

1238. Replace Ultraviolet Lamp Power Supply (2). Go to step 1.



1239. Set the POWER switch to OFF.

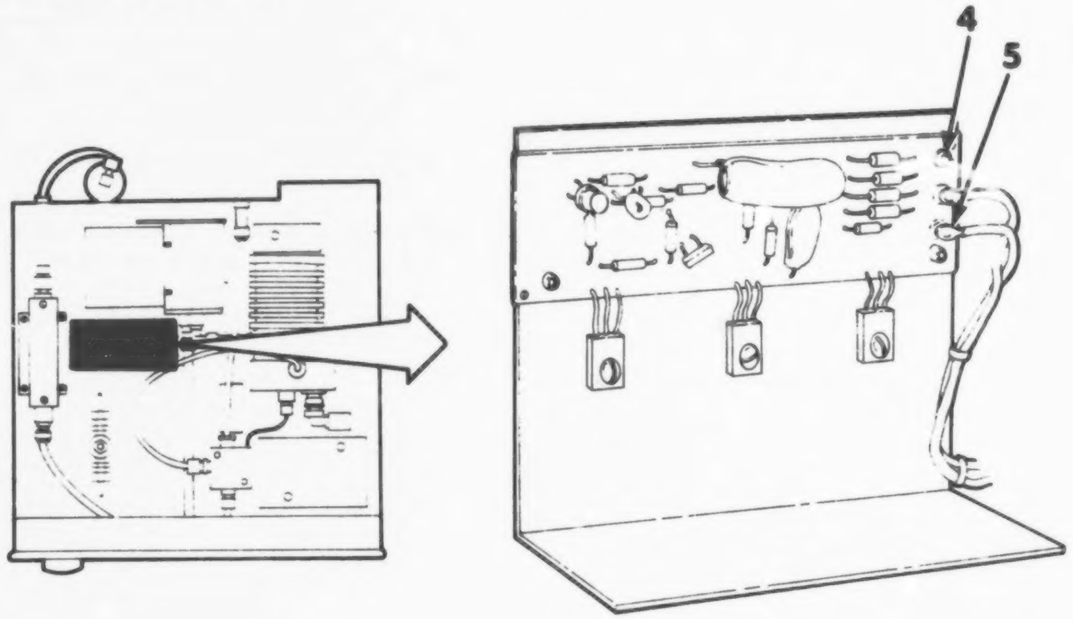
1240. Disconnect AC power from monitor.

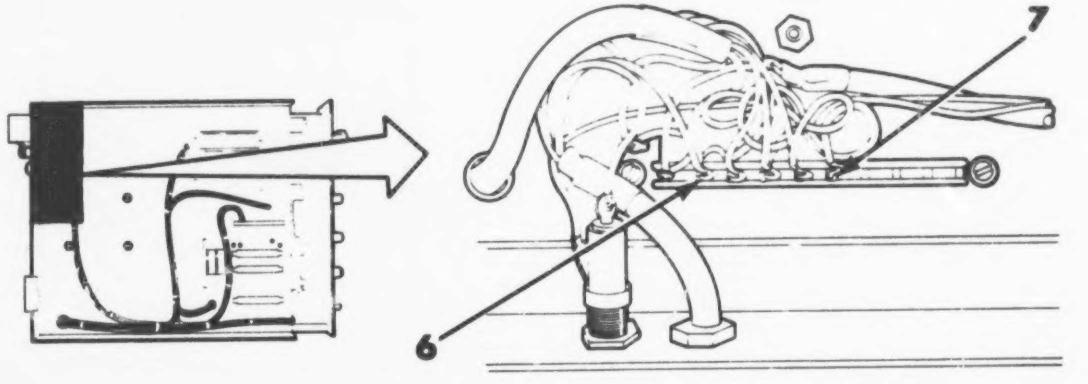
1241. Replace ultraviolet Lamp (3).

1242. Go to step 1.

1243. Use VOM to measure VAC. Connect positive test lead to MODE switch (1), common test lead to ground.

1244. Check that VOM indicates 100 VAC or more. If not, go to step 1248.





1245. Use VOM to measure VAC. Connect positive test lead to AC Current Regulator IN (2), common test lead to AC Current Regulator COM (3).

1246. Check that VOM indicates 100 VAC or more. If not, repair or replace wiring and connectors as necessary; go to step 1303.

1247. Replace AC Current Regulator (1). Go to step 1303.

1248. Use VOM to measure VAC. Connect positive test lead to MODE switch (9), common test lead to ground.

1249. Check that VOM indicates 100 VAC or more. If not, repair or replace wiring and connectors as necessary; go to step 1303.

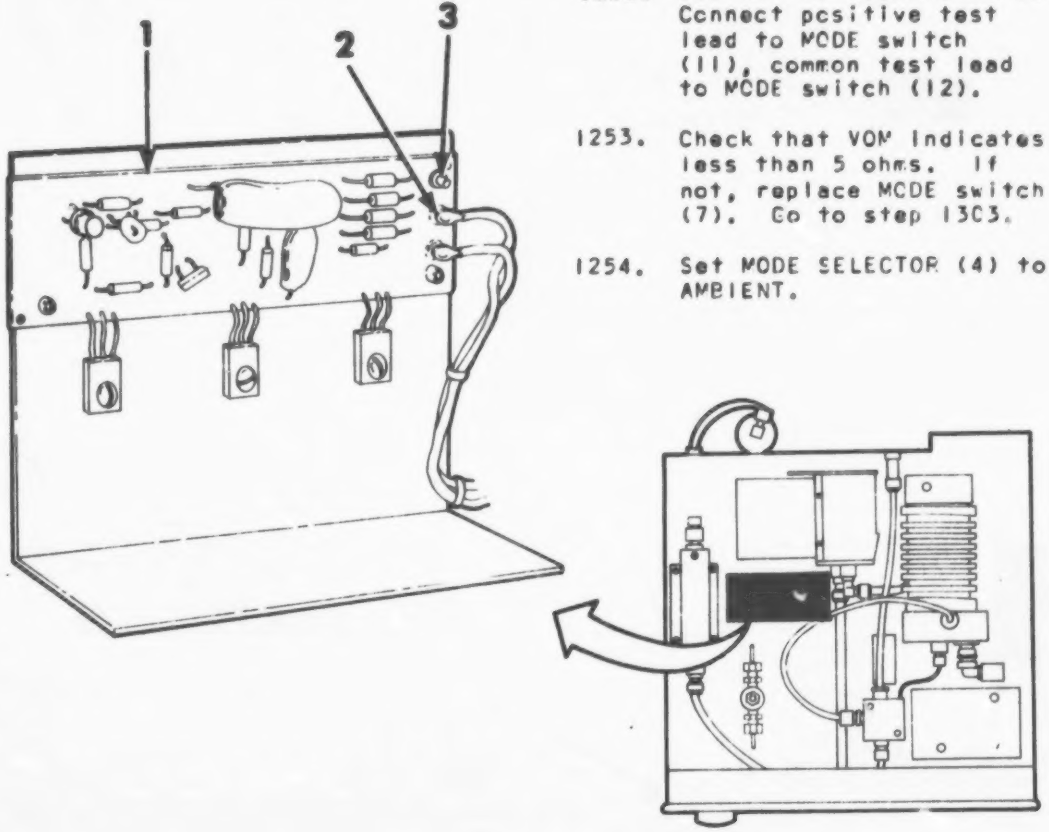
1250. Set the POWER switch to OFF.

1251. Disconnect AC power from monitor.

1252. Use VOM to measure OHMS. Connect positive test lead to MODE switch (11), common test lead to MODE switch (12).

1253. Check that VOM indicates less than 5 ohms. If not, replace MODE switch (7). Go to step 1303.

1254. Set MODE SELECTOR (4) to AMBIENT.



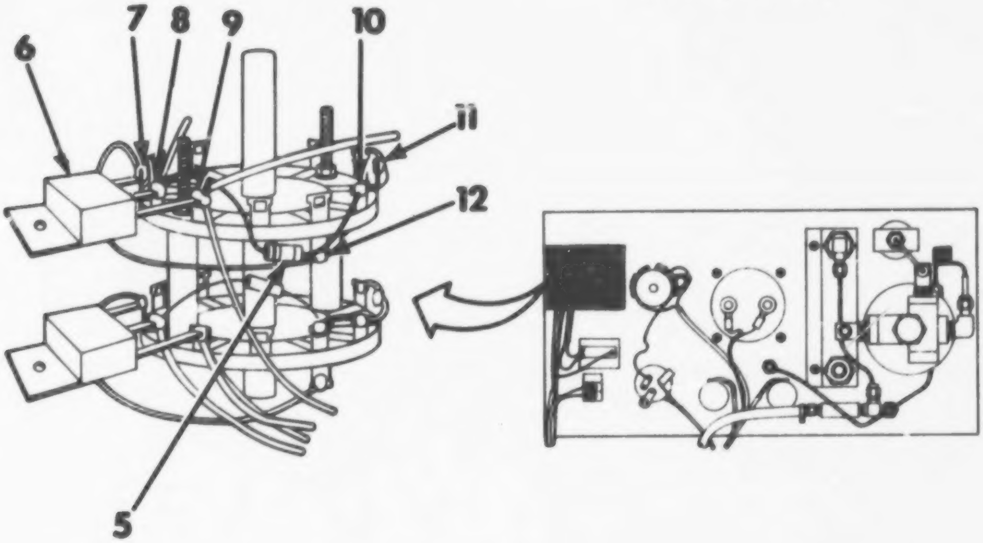
1255. Use VOM to measure OHMS. Connect positive test lead to MODE switch (8), common test lead to MODE switch (10).

1256. Check that VOM indicates between 950 and 1.1K ohms. If not, replace R21 (5). Go to step 1303.

1257. Use VOM to measure OHMS. Connect positive test lead to MODE switch (7), common test lead to MODE switch (12).

1258. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1303.

1259. Replace Triac (6). Go to step 1303.


6
7
8
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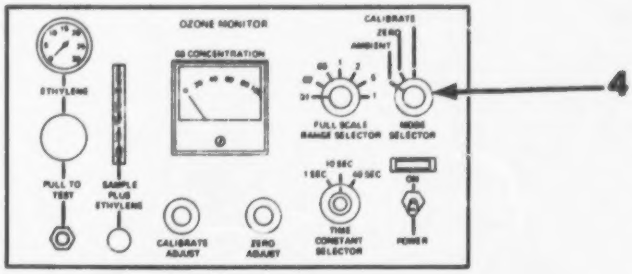

OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
4

1260. Insure Power Supply switch (1) is set to ON. If not, set switch (1) to ON and go to step 1.

1261. Set the POWER switch to OFF.

1262. Disconnect plug (4).

1263. Set the POWER switch to ON.

CAUTION

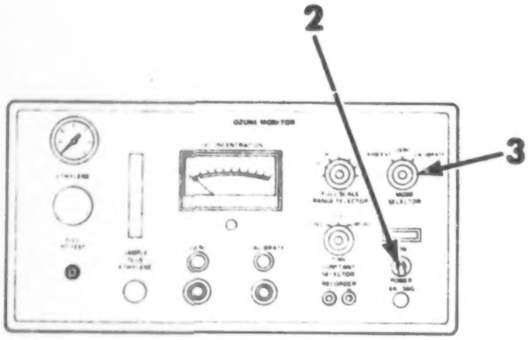
High voltage may be present on plug terminals. Use caution when connecting test leads.

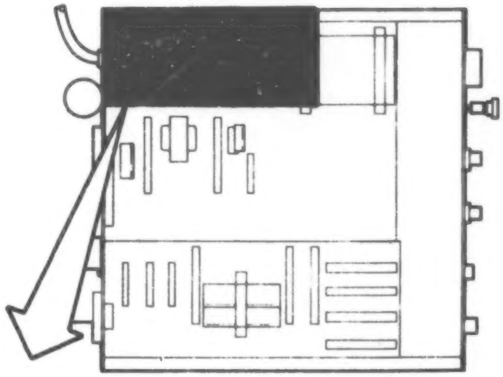
1264. Use VCM to measure VAC. Connect positive test lead to plug (10), common test lead to plug (9).

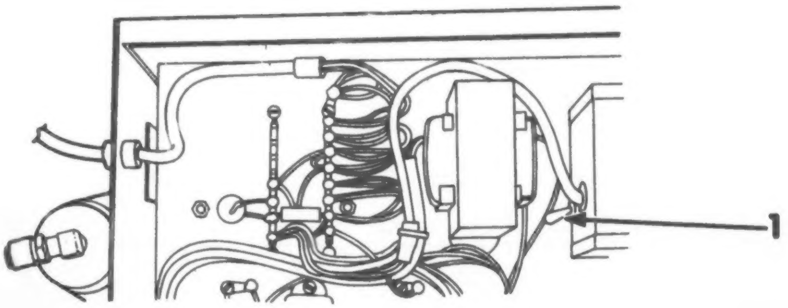
1265. Check that VCM indicates 800 VAC or more. If not, go to step 1275.

1266. Set the POWER switch to OFF.

1267. Reconnect plug.







1268. Remove ultraviolet lamp (5).

1269. Set the POWER switch to ON.

1270. Set MODE SELECTOR (3) to CALIBRATE.

1271. Check that ultraviolet lamp is lit. If not, go to step 1284.

1272. Set the POWER switch to OFF.

1273. Disconnect AC power from monitor.

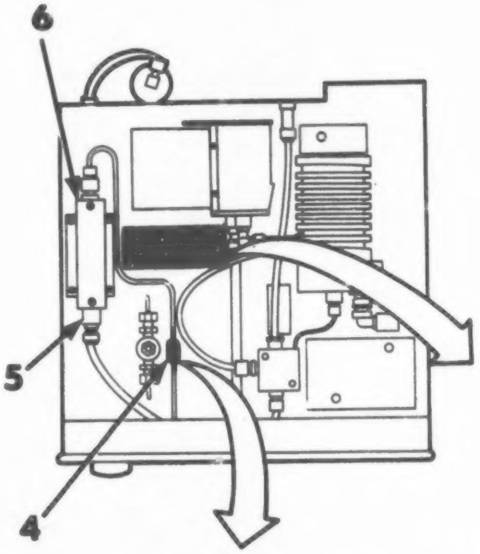
1274. Replace Ozone Generator (6). Go to step 1.

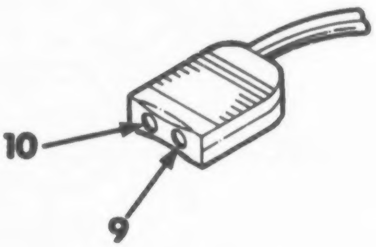
1275. Use VOM to measure VAC. Connect positive test lead to AC Current Regulator IN (8), common test lead to ground.

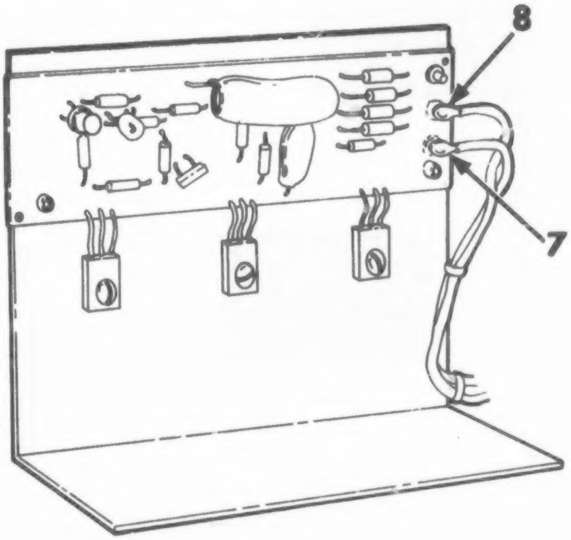
1276. Check that VOM indicates 100 VAC or more. If not, go to step 1288.

1277. Use VOM to measure VAC. Connect positive test lead to AC Current Regulator OUT (7), common test lead to ground.

1278. Check that VOM indicates 30 VAC or more. If not, go to step 1302.







1279. Set the POWER switch to OFF.

1280. Disconnect AC power from monitor.

1281. Use VOM to measure OHMS. Connect positive test lead to TP1-8 (1), common test lead to AC Current Regulator OUT (7).

1282. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1303.

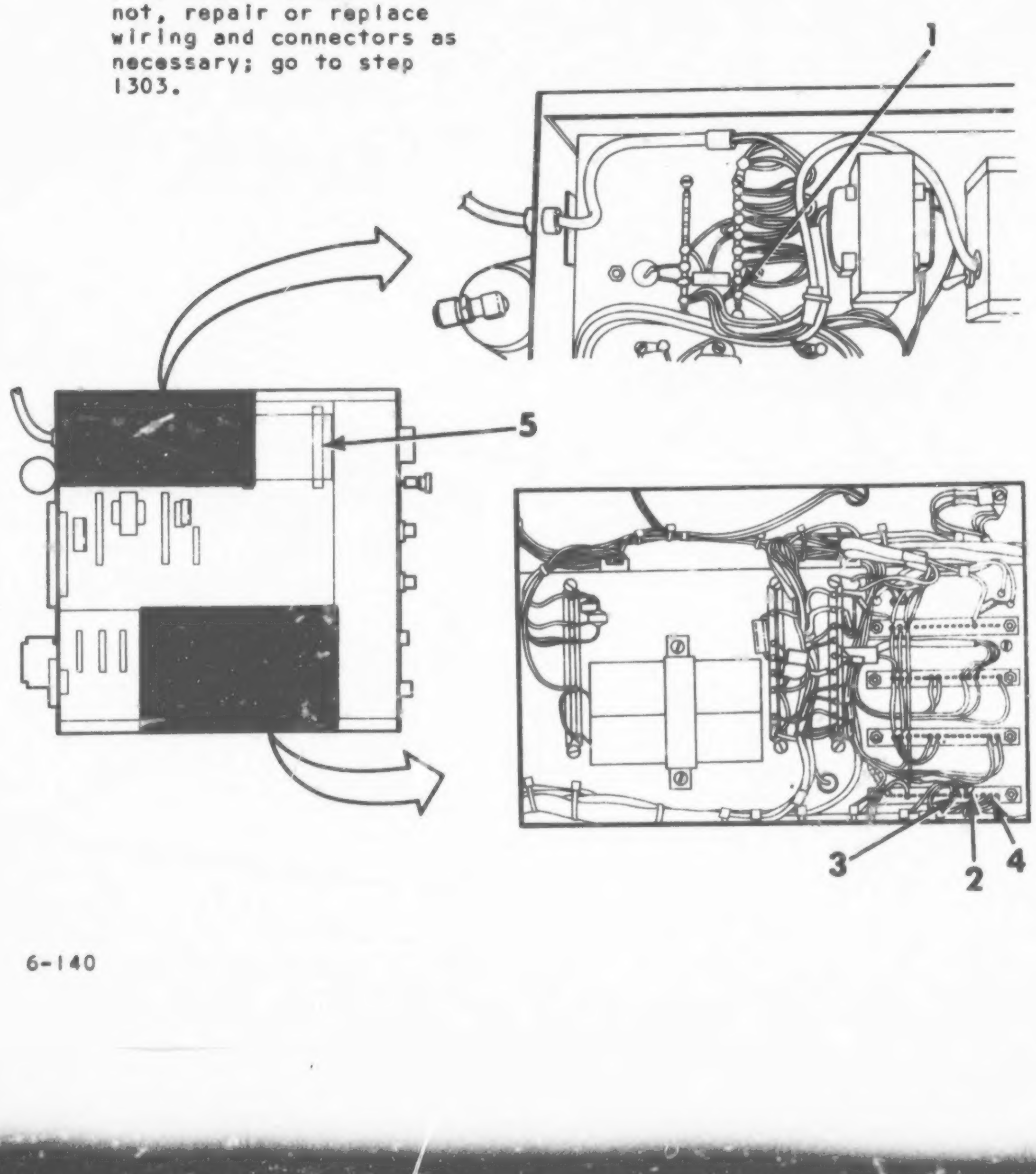
1283. Replace Ultraviolet Lamp Power Supply (5). Go to step 1.

1284. Set the POWER switch to OFF.

1285. Disconnect AC power from monitor.

1286. Replace Ultraviolet lamp (6).

1287. Go to step 1.



1288. Use VOM to measure VAC. Connect positive test lead to Alarm and Control Card (4), common test lead to ground.

1289. Check that VOM indicates 100 VAC or more. If not, go to step 1293.

1290. Set the POWER switch to OFF.

1291. Disconnect AC power from monitor.

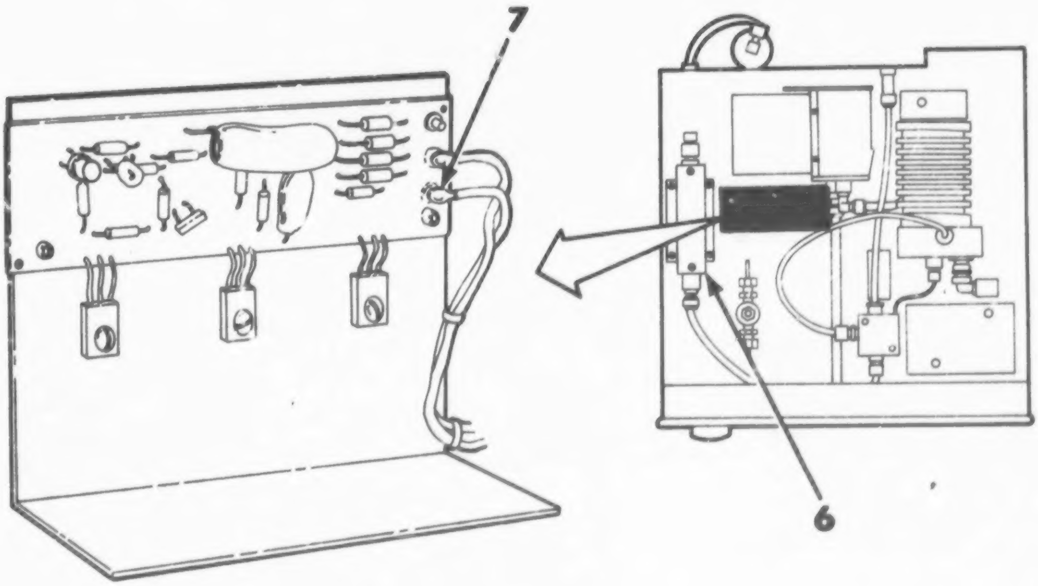
1292. Repair or replace wiring and connectors as necessary. Go to step 1303.

1293. Set the POWER switch to OFF.

1294. Disconnect AC power from monitor.

1295. Disconnect CR9 (2) from J4-5.

1296. Use VOM to measure OHMS. Connect positive test lead to CR9 (2), common test lead to J4-6 (3).



1297. Check that VOM indicates 100 ohms or less. If not, replace CR9 (1). Go to step 1303.

1298. Reconnect CR9 to J4-5.

1299. Use VOM to measure OHMS. Connect positive test lead to J4-5 (2), common test lead to S2A-C (3).

1300. Check that VOM indicates less than 5 ohms. If not, repair or replace wiring and connectors as necessary; go to step 1303.

1301. Replace Alarm and Valve Control Card (4). Go to step 1303.

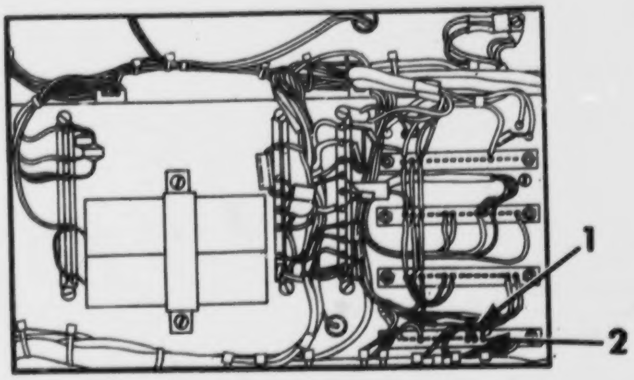
1302. Replace AC Current Regulator (5).

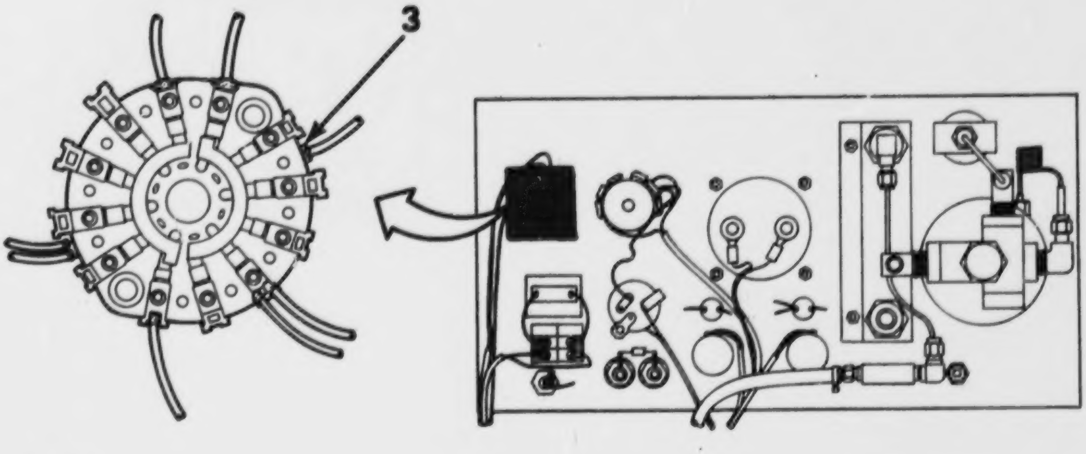
1303. Reconnect plug.

1304. Go to step 1.

1305. Set the POWER switch to OFF.

1306. Disconnect AC power from monitor.



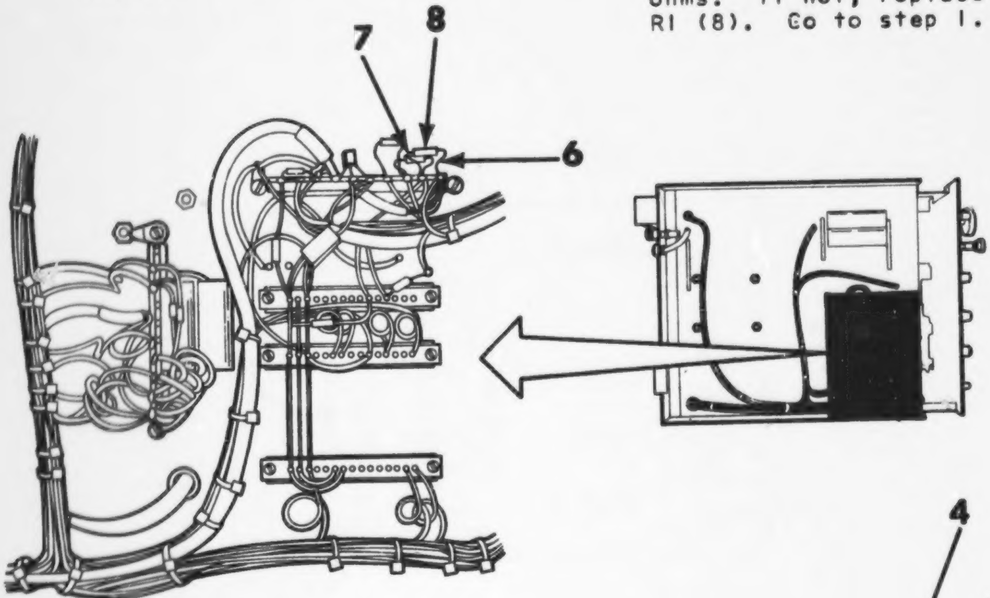


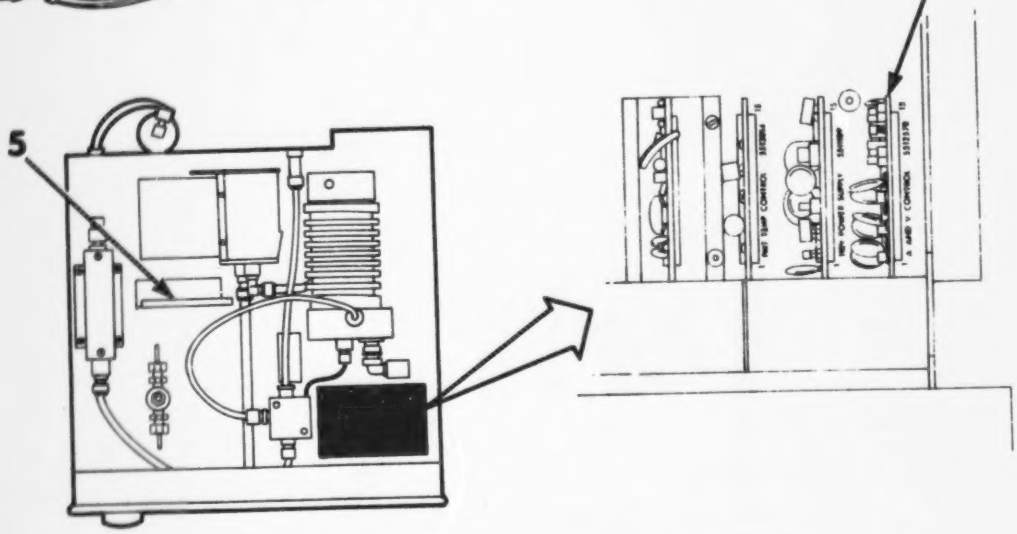
1307. If you are servicing a MOD C monitor, go to step 1317. If not, go to next step.

1308. Disconnect R1 (6) from TP3-1.

1309. Use VOM to measure OHMS. Connect positive test lead to R1 (6), common test lead to R1 (7).

1310. Check that VOM indicates between 950 and 1.1K ohms. If not, replace R1 (8). Go to step 1.



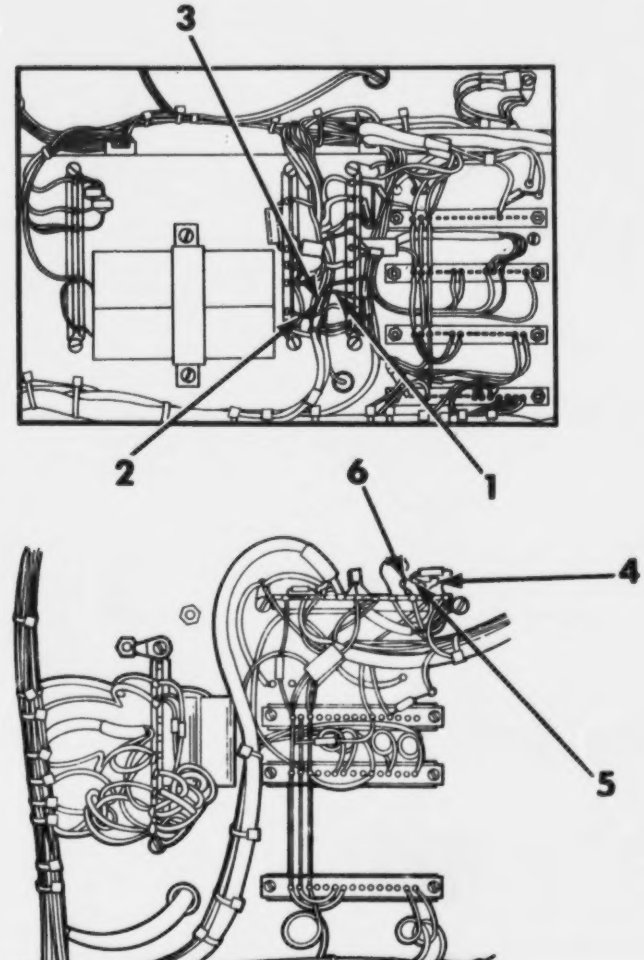


1311. Reconnect R1 to TP3-1.

1312. Disconnect R2 (6) from TP3-3.

1313. Use VOM to measure OHMS. Connect positive test lead to R2 (6), common test lead to R2 (4).

1314. Check that VOM indicates between 950K and 1.1M ohms. If not, replace R2 (5). Go to step 1.



1315. Reconnect R2 to TP3-3.

1316. Repair or replace wiring and connectors as necessary. Go to step 1.

1317. Disconnect R34 (2) from TP6-9.

1318. Use VOM to measure OHMS. Connect positive test lead to R34 (2), common test lead to R34 (1).

1319. Check that VOM indicates between 95 and 105 ohms. If not, replace R34 (3). Go to step 1.

1320. Reconnect R34 to TP6-9.

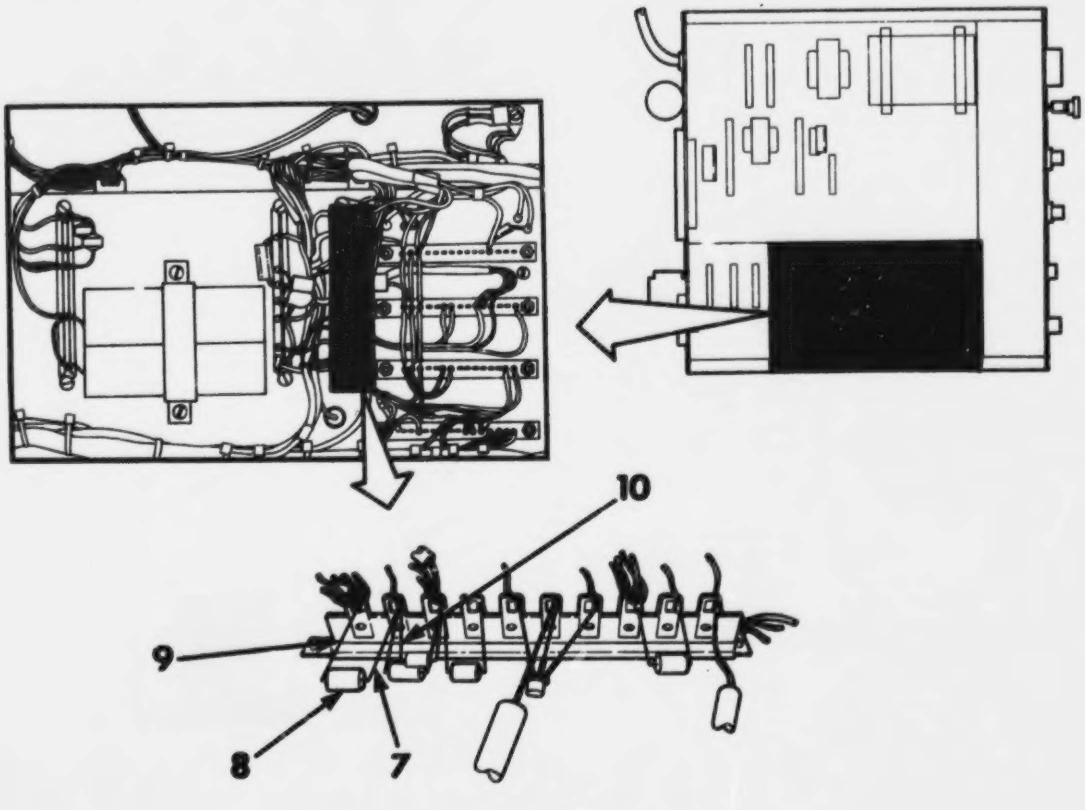
1321. Disconnect R1 (7) from TP7-10.

1322. Use VOM to measure OHMS. Connect positive test lead to R1 ,(9), common test lead to R1 (7).

1323. Check that VOM indicates between 950 and 1.1K ohms. If not, replace R1 (8). Go to step 1.

1324. Reconnect R1 to TP7-10.

1325. Disconnect R2 (10) from TP7-8.



1326. Use VOM to measure OHMS. Connect positive test lead to R2 (4), common test lead to R2 (6).

1327. Check that VOM indicates between 95K and 110K ohms. If not, replace R2 (5). Go to step 1.

1328. Disconnect R33 (7) from TP7-8.

1329. Use VOM to measure OHMS. Connect positive test lead to R33 (7), common test lead to R33 (6).

1330. Check that VOM indicates between 950K and 1.1M ohms. If not, replace R3 (1). Go to step 1.

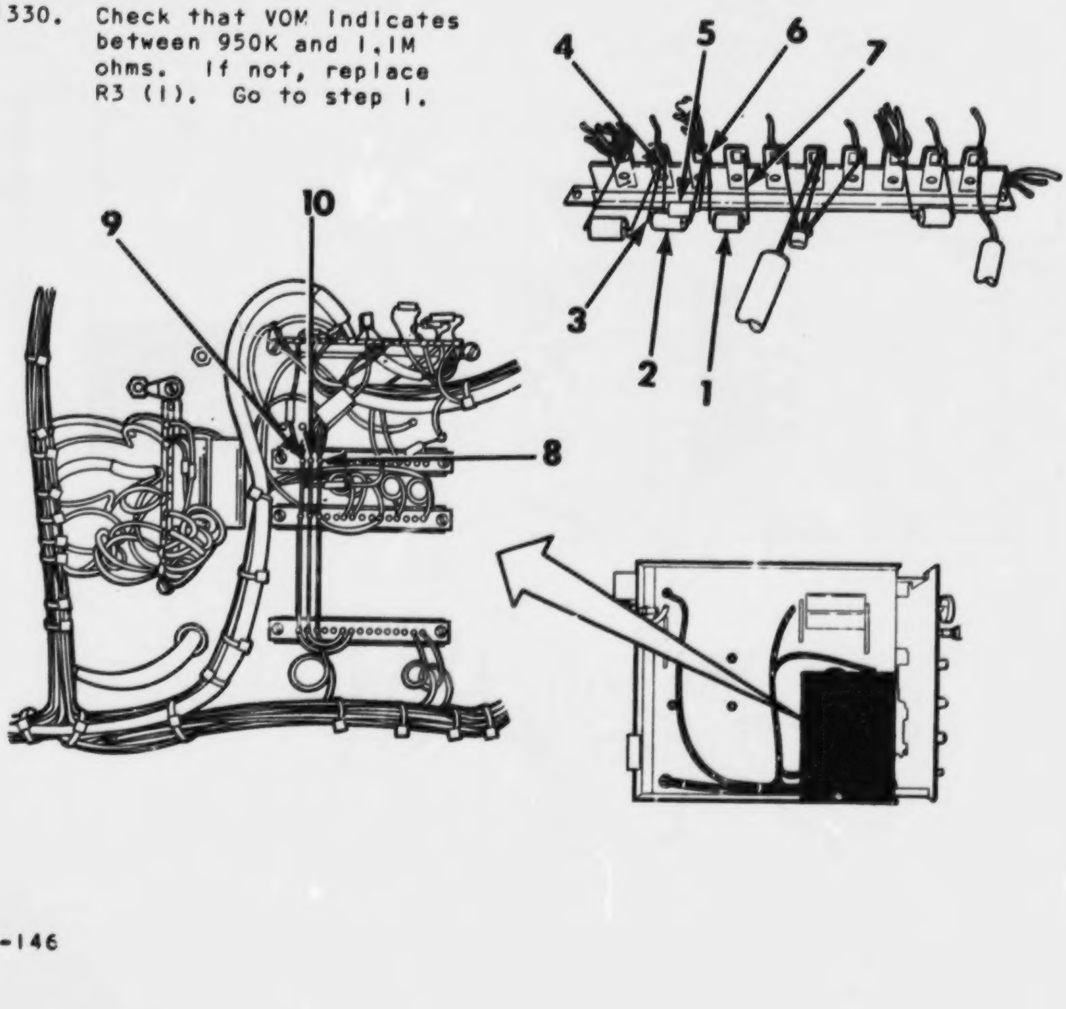
1331. Disconnect R22 (3) from TP7-8.

1332. Use VOM to measure OHMS. Connect positive test lead to R22 (3), common test lead to R22 (6).

1333. Check that VOM indicates between 9M and 11M ohms. If not, replace R22 (2). Go to step 1.

1334. Reconnect R22 to TP7-8.

1335. Reconnect R33 to TP7-8.



1336. Reconnect R2 to TP7-8.

1337. Repair or replace wiring and connectors as necessary. Go to step 1.

1338. If you are servicing a MOD-C monitor, go to step 1579. If not, go to next step.

1339. Record ZERO ADJUST micrometer setting.

1340. Using ZERO ADJUST micrometer, adjust meter for 0. If unable to adjust for 0, go to step 1342.

1341. Go to step 80.

1342. Use VOM to measure VDC. Connect positive test lead to J1 pin 13 (8), common test lead to J1 pin 14 (10).

1343. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1349.

1344. Use VOM to measure VDC. Connect positive test lead to J1 pin 15 (9), common test lead to J1 pin 13 (8).

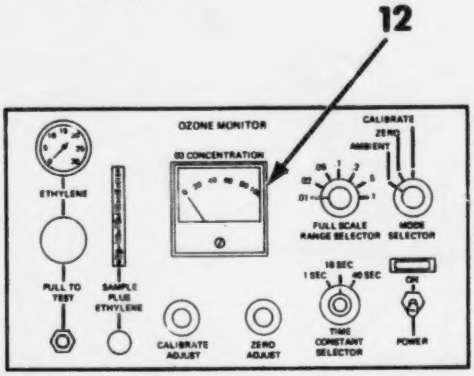
1345. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1353.

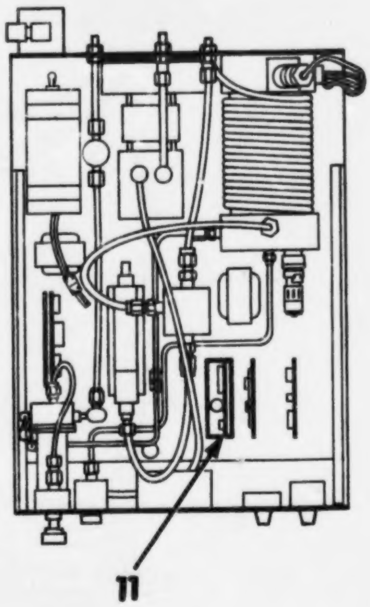
1346. Interchange Electrometer Amplifier PC Board (11) with a new one.

1347. Check that O3 CONCENTRATION meter (12) indicates 0 within 1 minute. If not, go to step 1357.

1348. Go to step 1.

1349. Check that VOM indication was low. If not, go to step 1364.


12
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
FULL SCALE RANGE SELECTOR
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER



1350. Use VOM to measure VDC. Connect positive test lead to J3 pin 13 (1), common test lead to J3 pin 14 (2).

1351. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1369.

1352. Repair or replace wiring and connectors as necessary. Go to step 1.

1353. Check that VOM indication was low. If not, go to step 1377.

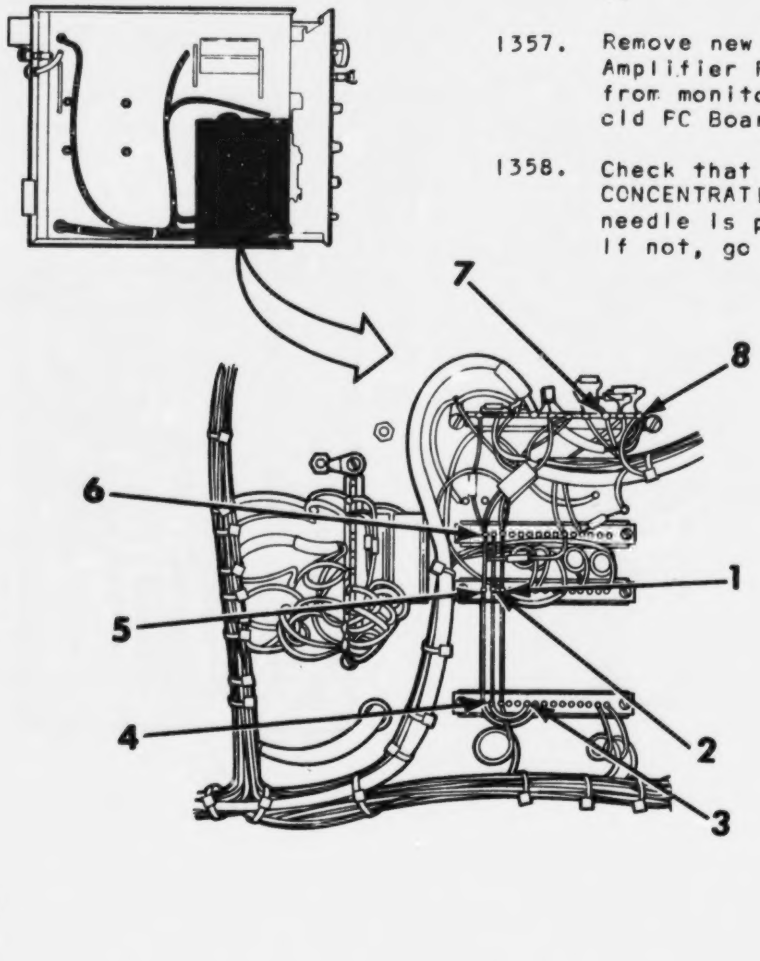
1354. Use VOM to measure VDC. Connect positive test lead to J3 pin 15 (5), common test lead to J3 pin 13 (1).

1355. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1382.

1356. Repair or replace wiring and connectors as necessary. Go to step 1.

1357. Remove new Electrometer Amplifier PC Board (10) from monitor, reinstall old PC Board.

1358. Check that O3 CONCENTRATION meter needle is pegged left. If not, go to step 1390.



1359. Use VOM to measure VDC. Connect positive test lead to terminal (8), common test lead to terminal (7).

1360. Check that VOM indicates 1 VDC or less. If not, go to step 1397.

1361. Use VOM to measure VDC. Connect positive test lead to terminal (7), common test lead to terminal (8).

1362. Check that VOM indicates 1 VDC or less. If not, go to step 1397.

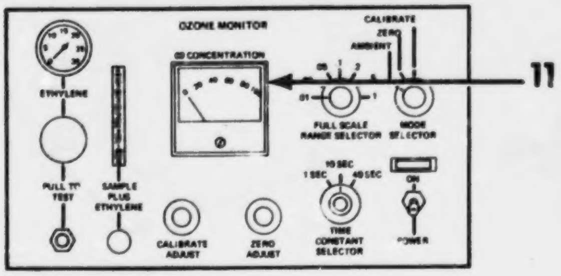
1363. Replace 03 CONCENTRATION meter (11). Go to step 1.

1364. Set the POWER switch to OFF.

1365. Disconnect AC power from monitor.

1366. Use VOM to measure OHMS. Connect positive test lead to J3 pin 10 (3), common test lead to J3 pin 14 (4).

1367. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 1.


OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
11

1368. Replace 110V Regulator P.C. Board (9). Go to step 1.

1369. Set the POWER switch to OFF.

1370. Disconnect AC power from monitor.

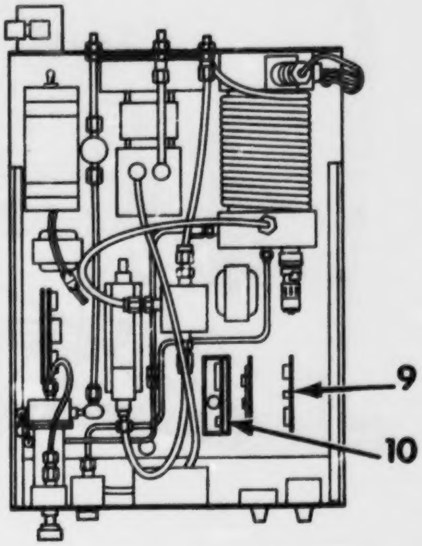
1371. Remove Electrometer Amplifier P.C. Board (10).

1372. Connect AC power to monitor.

1373. Set the POWER switch to ON.

1374. Use VOM to measure VDC. Connect positive test lead to J3 pin 13 (1), common test lead to J3 pin 14 (6).

1375. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1435.



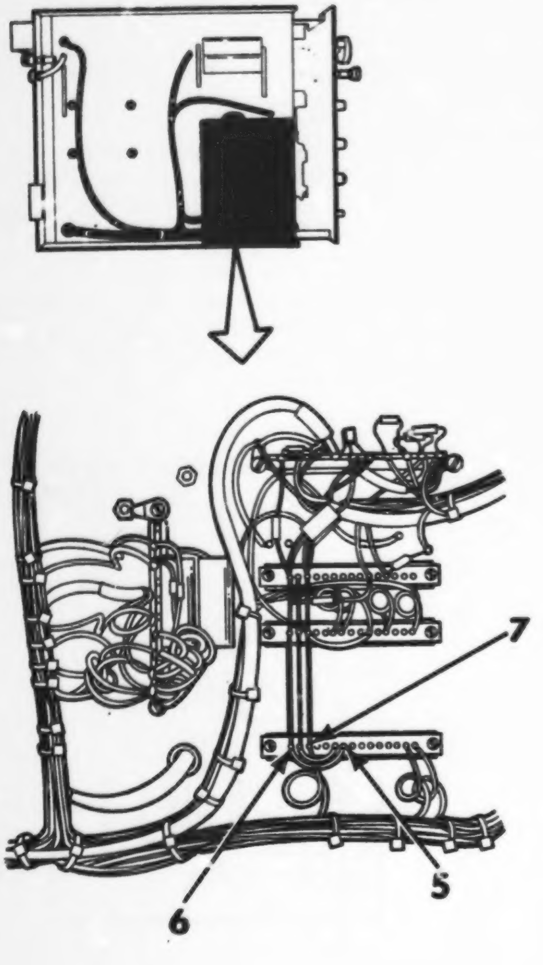
1376. Replace Electrometer Amplifier P.C. Board (2). Go to step 1.

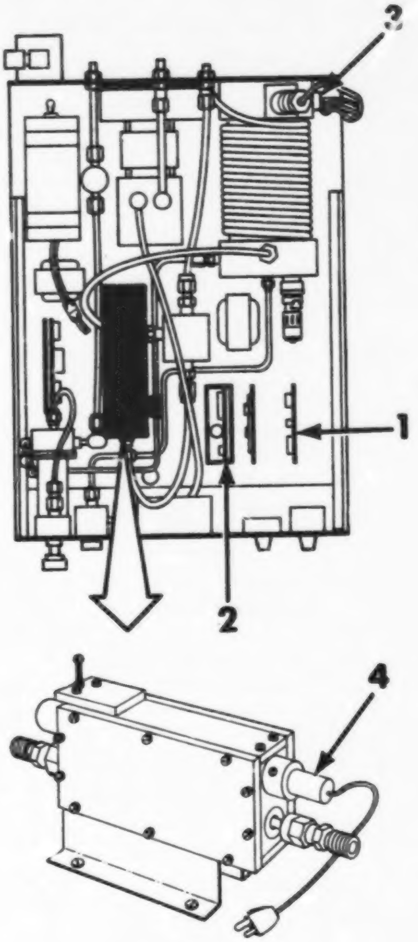
1377. Set the POWER switch to OFF.

1378. Disconnect AC power from monitor.

1379. Use VOM to measure OHMS. Connect positive test lead to J3 pin 9 (5), common test lead to J3 pin 15 (6).

1380. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 1.





1381. Replace 110V Regulator P.C. Board (1). Go to step 1.

1382. Set the POWER switch to OFF.

1383. Disconnect AC power from monitor.

1384. Remove Electrometer Amplifier P.C. Board (2).

1385. Connect AC power to monitor.

1386. Set the POWER switch to ON.

1387. Use VOM to measure VDC. Connect positive test lead to J3 pin 15 (6), common test lead to J3 pin 13 (7).

1388. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1446.

1389. Replace Electrometer Amplifier P.C. Board (2). Go to step 1.

1390. Check that ultraviolet lamp (4) is not lit. If lit, go to step 1457.

1391. Disconnect SAMPLE INLET (8) and check that O3 CONCENTRATION meter indication is uneffected. If effected, go to step 1457.

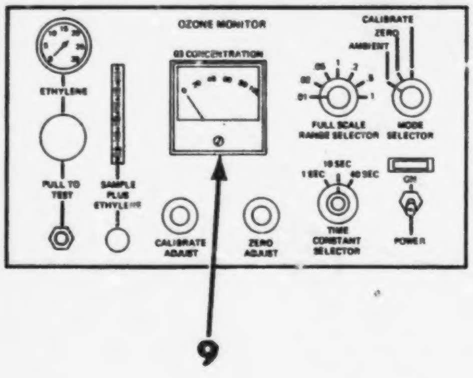
1392. Disconnect P7 (3) from detector cell.

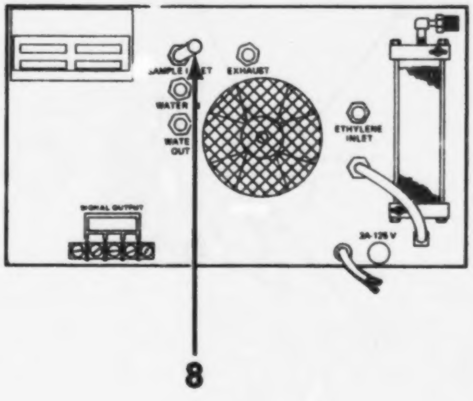
1393. Check that O3 CONCENTRATION meter (9) indicates 0 within 1 minute. If not, go to step 1395.

1394. Next, Replace Detector Cell Assembly, procedure begins at page 7-21 . Go on to step 1 when finished.

1395. Reconnect P7 to detector cell.

1396. Go to step 1359.


OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
9


SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
2A-125 V
8

1397. Use VOM to measure VDC. Connect positive test lead to potentiometer terminal (2), common test lead to potentiometer terminal (1).

1398. Check that VOM indicates between 105 and 115 VDC. If not, repair or replace wiring and connectors as necessary; go to step 1.

1399. Set the POWER switch to OFF.

1400. Disconnect AC power from monitor.

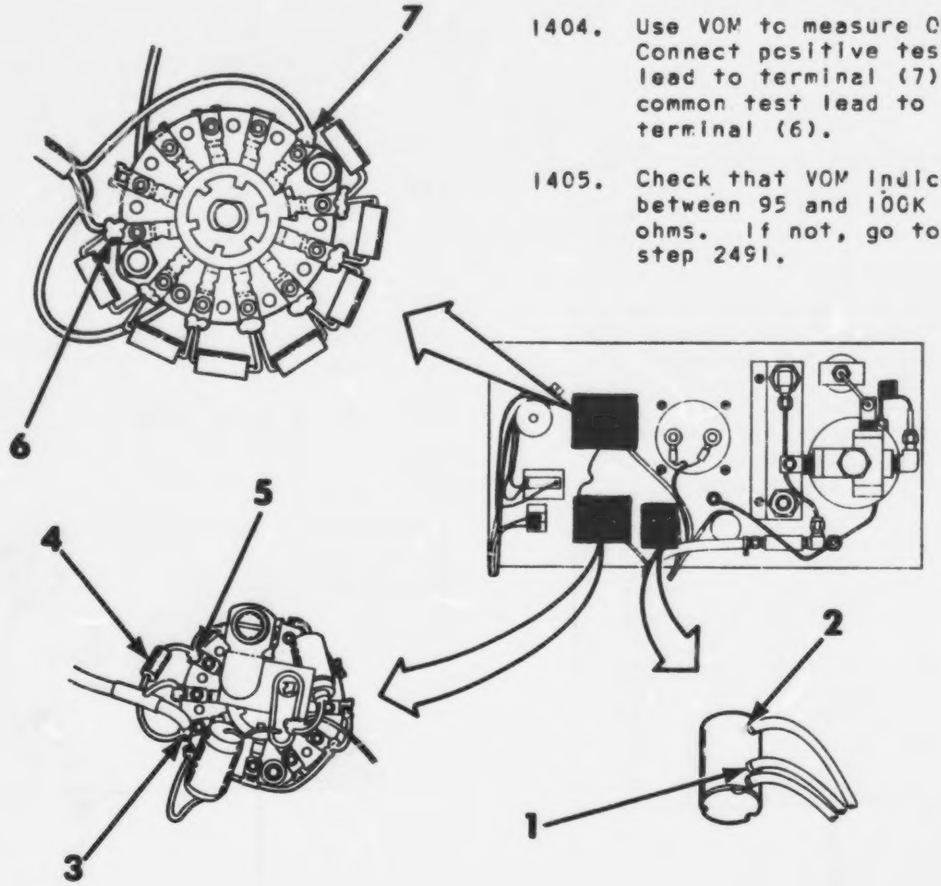
1401. Disconnect and tag lead (7).

1402. Disconnect and tag lead (6)

1403. Disconnect and tag lead (8).

1404. Use VOM to measure OHMS. Connect positive test lead to terminal (7), common test lead to terminal (6).

1405. Check that VOM indicates between 95 and 100K ohms. If not, go to step 2491.



1406. Use VOM to measure OHMS. Connect positive test lead to terminal (8), common test lead to terminal (7).

1407. Check that VOM indicates 5 ohms or less. If not, go to step 2490.

1408. Use VOM to measure OHM. Connect positive test lead to terminal (8), common test lead to terminal (6).

1409. Check that VOM indicates between 95 and 105K ohms. If not, go to step 2490.

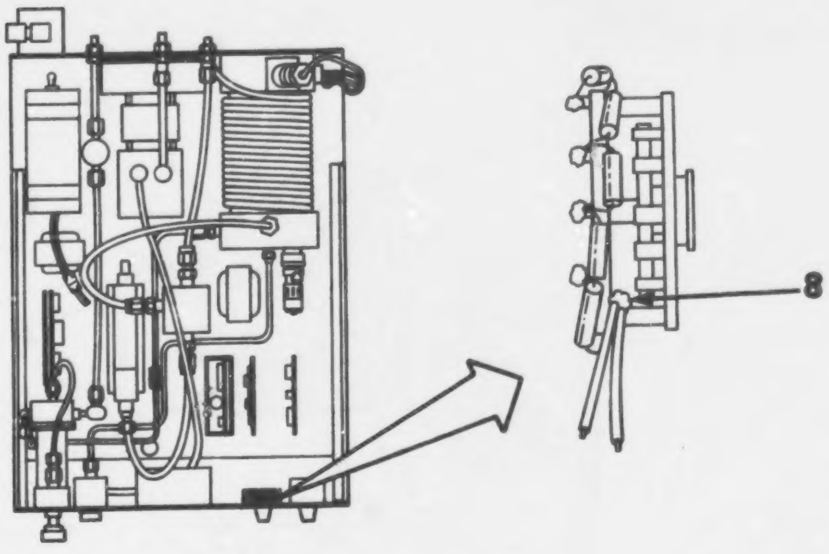
1410. Reconnect wire to terminal (7).

1411. Reconnect wire to terminal (6).

1412. Reconnect wire to terminal (8).

1413. Use VOM to measure OHMS. Connect positive test lead to terminal (5), common test lead to terminal (3).

1414. Check that VOM indicates between .9 and 1.1M ohms. If not, replace resistor R12 (4). Go to step 1.



1415. Use VOM to measure OHMS. Connect positive test lead to terminal (4), common test lead to terminal (3).

1416. Check that VOM indicates between 9.5 and 10.5K ohms. If not, replace resistor R15 (5). Go to step 1.

1417. Disconnect wire from terminal (11).

NOTE

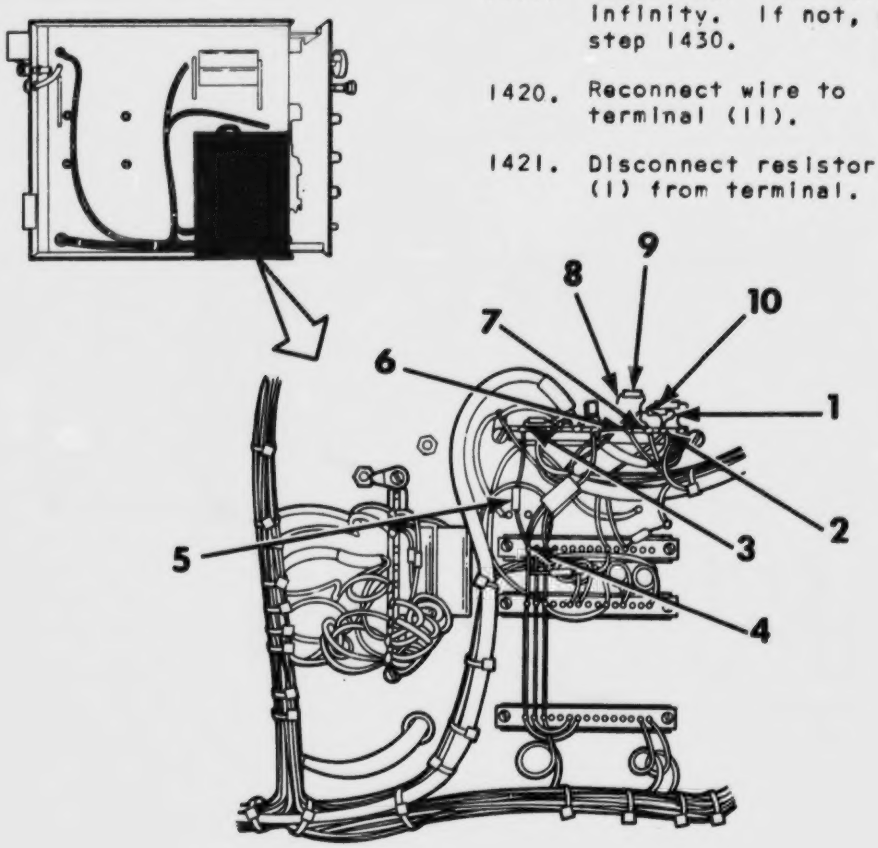
In the next step a very large resistance is to be measured. This resistance is beyond the range of most VOMS. Consider the check good if the indication is as high as the VOM will indicate.

1418. Use VOM to measure OHMS. Connect positive test lead to terminal (11), common test lead to terminal (12).

1419. Check that VOM indicates infinity. If not, go to step 1430.

1420. Reconnect wire to terminal (11).

1421. Disconnect resistor lead (1) from terminal.



1422. Use VOM to measure OHMS. Connect positive test lead to resistor lead (1), common test lead to terminal (7).

1423. Check that VOM indicates between 15 and 25M ohms. If not, replace resistor R22 (10). Go to step 1.

1424. Reconnect resistor lead to terminal (2).

1425. Disconnect resistor lead (8) from terminal.

1426. Use VOM to measure OHMS. Connect positive test lead to resistor lead (8), common test lead to terminal (7).

1427. Check that VOM indicates between .9 and 1.1M ohms. If not, replace resistor R4 (9). Go to step 1.

1428. Reconnect resistor lead to terminal (6).

1429. Repair or replace wiring and connectors as necessary. Go to step 1.

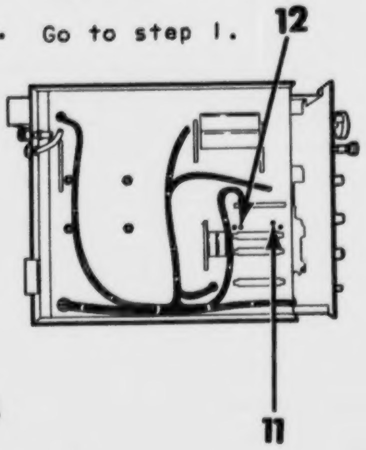
1430. Remove P.C. board shield (14).

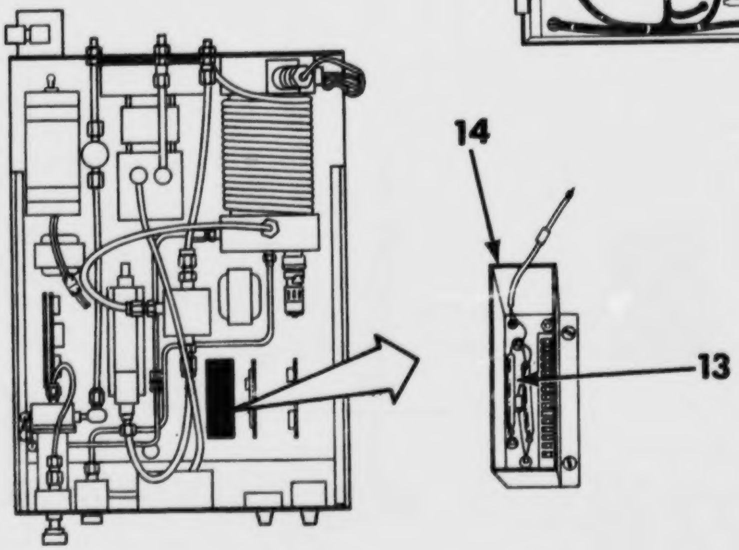
1431. Replace resistor R18 (13).

1432. Reinstall P.C. board shield.

1433. Reconnect wire to terminal (11).

1434. Go to step 1.





1435. Reinstall Electrometer Amplifier P.C. Board.

1436. Use VOM to measure VDC. Connect positive test lead to J3 pin 13 (5), common test lead to J3 pin 2 (1).

1437. Check that VOM indicates 120 VDC or more. If not, go to step 1475.

1438. Set the POWER switch to OFF.

1439. Disconnect AC power from monitor.

1440. Remove 110V Regulator P.C. Board (6).

1441. Use VOM to measure OHMS. Connect positive test lead to J3 pin 14 (4), common test lead to J3 pin 13 (5).

1442. Check that VOM indicates 40K ohms or more. If not, go to step 1483.

1443. Use VOM to measure OHMS. Connect positive test lead to J3 pin 14 (4), common test lead to J3 pin 15 (3).

1444. Check that VOM indicates 50K ohms or more. If not, go to step 1490.

1445. Replace 110V Regulator P.C. Board (6). Go to step 1.

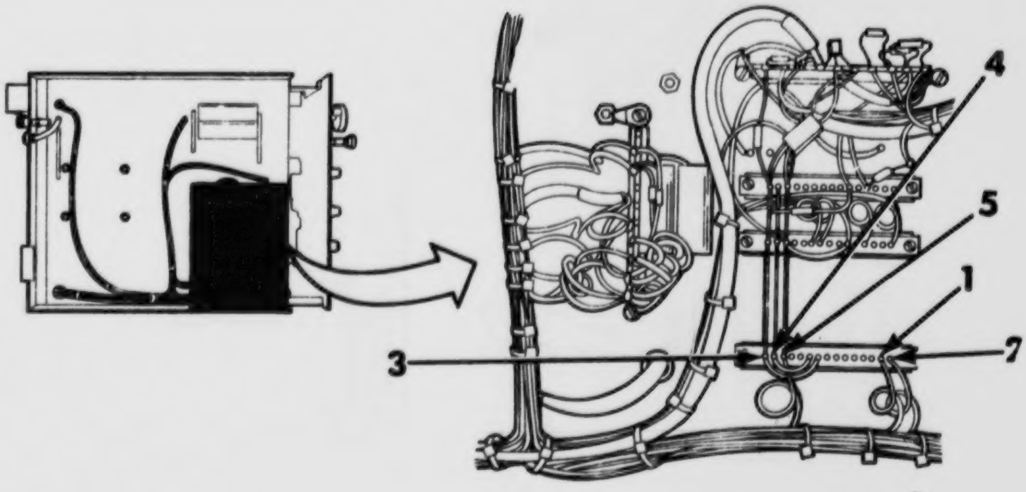
1446. Reinstall Electrometer Amplifier P.C. Board.

1447. Use VOM to measure VDC. Connect positive test lead to J3 pin 1 (2), common test lead to J3 pin 13 (5).

1448. Check that VOM indicates 120 VDC or more. If not, go to step 1497.

1449. Set the POWER switch to OFF.

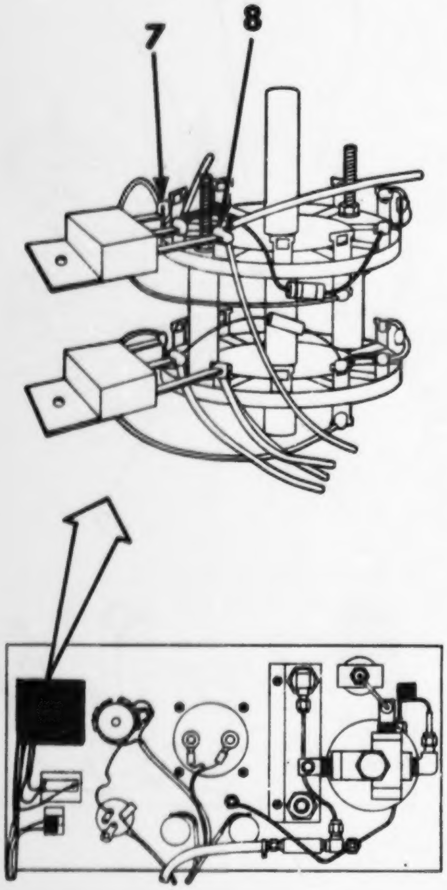
1450. Disconnect AC power from monitor.



1451. Remove 110V Regulator P.C. Board (6).

1452. Use VOM to measure OHMS. Connect positive test lead to J3 pin 15 (3), common test lead to J3 pin 13 (5).

1453. Check that VOM indicates 20K ohms or more. If not, go to step 1505.



1454. Use VOM to measure OHM. Connect positive test lead to J3 pin 15 (3), common test lead to J3 pin 14 (4).

1455. Check that VOM indicates 50K ohms or more. If not, go to step 1513.

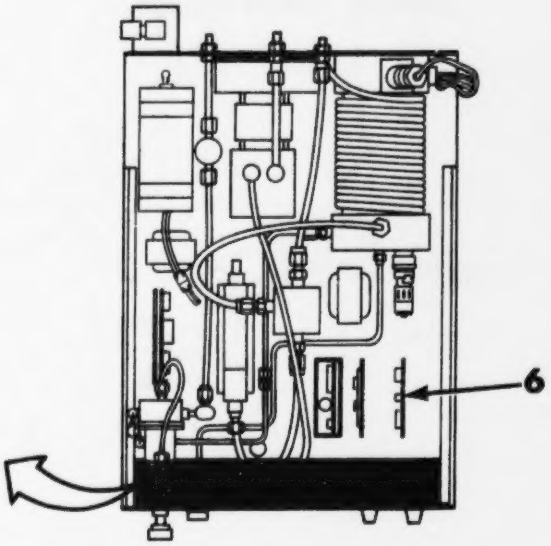
1456. Replace 110V Regulator P.C. Board (6). Go to step 1.

1457. Set the POWER switch to OFF.

1458. Disconnect AC power from monitor.

1459. Use VOM to measure OHMS. Connect positive test lead to switch terminal (7), common test lead to switch terminal (8).

1460. Check that VOM indicates 50K ohms or more. If not, go to step 1520.



1461. Disconnect triac lead (6) from switch terminal.

1462. Connect AC power to monitor.

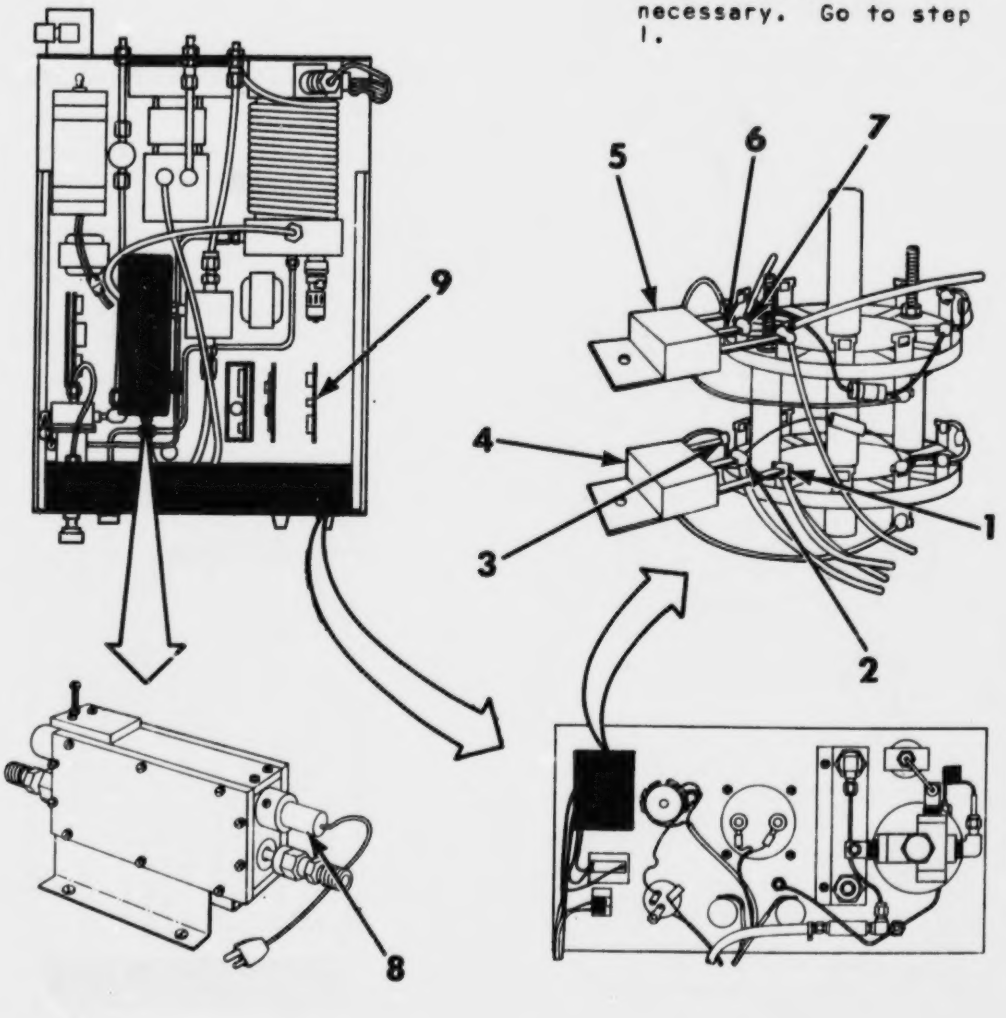
1463. Set the POWER switch to ON.

1464. Check that ultraviolet lamp (8) is not lit. If lit, go to step 1466.

1465. Replace triac (5). Go to step 1.

1466. Reconnect triac lead to switch terminal (7).

1467. Repair or replace wiring and connectors as necessary. Go to step 1.



1468. Use VOM to measure VAC. Connect positive test lead to switch terminal (2), common test lead to switch terminal (1).

1469. Check that VOM indicates 20 VAC or more. If not, go to step 1526.

1470. Set the POWER switch to OFF.

1471. Disconnect AC power from monitor.

1472. Use VOM to measure OHMS. Connect positive test lead to switch terminal (3), common test lead to switch terminal (2).

1473. Check that VOM indicates between .8 and 1.2K ohms. If not, go to step 1529.

1474. Replace triac (4). Go to step 1.

1475. Set the POWER switch to OFF.

1476. Disconnect AC power from monitor.

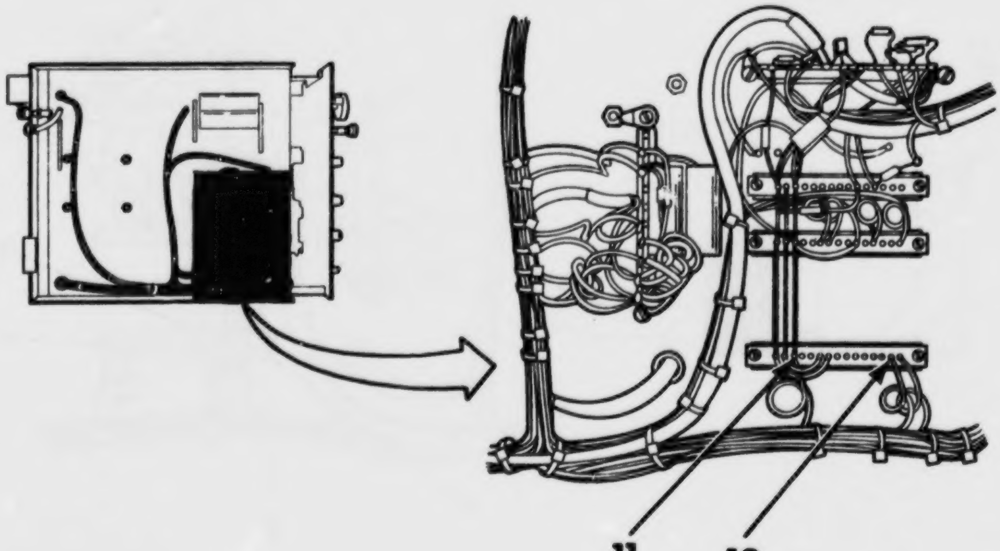
1477. Remove 110V Regulator P.C. Board (9).

1478. Connect AC power to monitor.

1479. Set the POWER switch to OFF.

1480. Use VOM to measure VDC. Connect positive test lead to J3 pin 13 (11), common test lead to J3 pin 2 (10).

1481. Check that VOM indicates 120 VDC or more. If not, go to step 1534.



1482. Replace 110V Regulator P.C. Board (8). Go to step 1.

1483. Remove Electrometer Amplifier P.C. Board (9).

1484. Use VOM to measure OHMS. Connect positive test lead to J3 pin 14 (3), common test lead to J3 pin 1 (2).

1485. Check that VOM indicates 1M ohms or more. If not, repair or replace wiring and connectors as necessary; go to step 1487.

1486. Replace Electrometer Amplifier P.C. Board (9). Go to step 1488.

1487. Reinstall Electrometer Amplifier P.C. Board.

1488. Reinstall 110V Regulator P.C. Board.

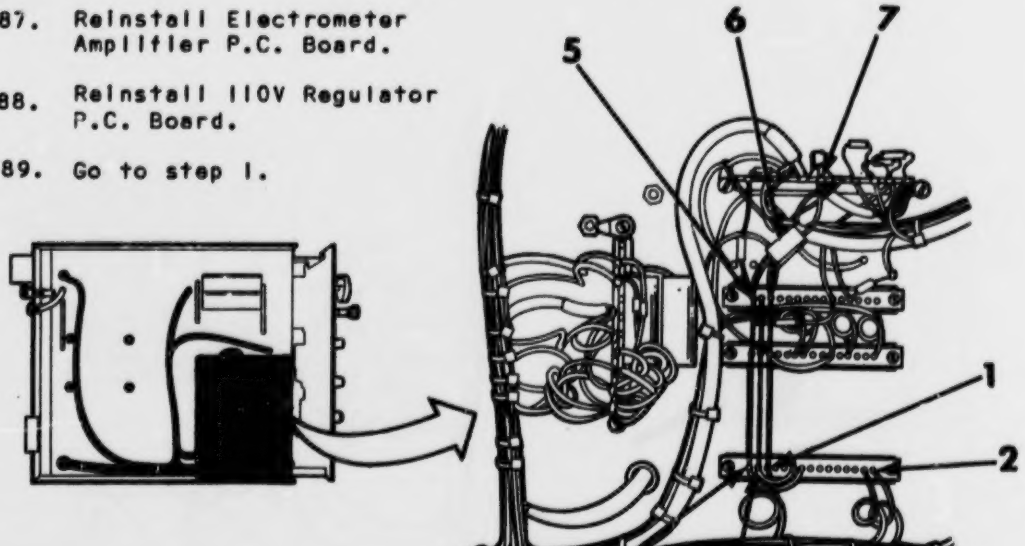
1489. Go to step 1.

1490. Remove Electrometer Amplifier P.C. Board (9).

1491. Use VOM to measure OHM. Connect positive test lead to J3 pin 14 (3), common test lead to J3 pin 15 (4).

1492. Check that VOM indicates 1M ohms or more. If not, repair or replace wiring and connectors as necessary; go to step 1494.

1493. Replace Electrometer Amplifier P.C. Board (9). Go to step 1495.



1494. Reinstall Electrometer Amplifier P.C. Board.

1495. Reinstall 110V Regulator P.C. Board.

1496. Go to step 1.

1497. Set the POWER switch to OFF.

1498. Disconnect AC power from monitor.

1499. Remove 110V Regulator p.C. Board (8).

1500. Connect AC power to monitor.

1501. Set the POWER switch to ON.

1502. Use VOM to measureVDC. Connect positive test lead to J3 pin 1 (2), common test lead to J3 pin 13 (1).

1503. Check that VOM indicates 120 VDC or more. If not, go to step 1541.

1504. Replace 110V Regulator P.C. Board (8). Go to step 1.

1505. Use VOM to measure OHMS. Connect positive test lead to J1 pin 15 (5), common test lead to terminal (7).

1506. Check that VOM indicates 2.5K ohms or more. If not, replace resistor R16 (6). Go to step 1511.

1507. Remove Electrometer Amplifier P.C. Board (9).

1508. Use VOM to measure OHMS. Connect positive test lead to J3 pin 15 (4), common test lead to J3 pin 13 (1).

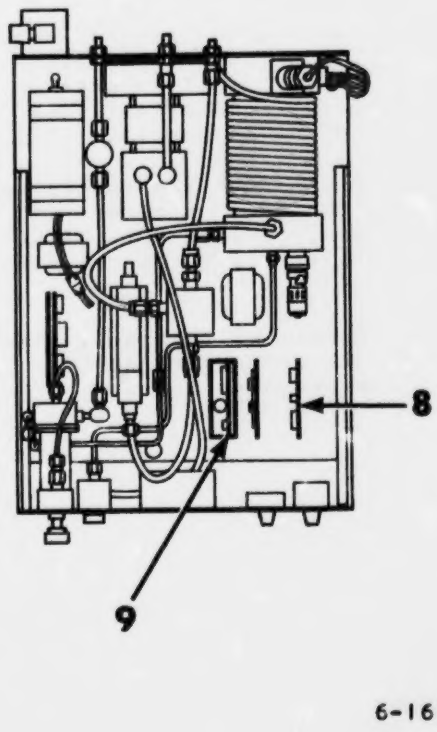
1509. Check that VOM indicates 20K ohms or more. If not, go to step 1544.

1510. Replace Electrometer Amplifier P.C. Board (9).

1511. Reinstall 110V Regulator P.C. Board.

1512. Go to step 1.

1513. Remove Electrometer Amplifier P.C. Board (9).



1514. Use VOM to measure OHMS. Connect positive test lead to J3 pin 14 (1), common test lead to J3 pin 15 (2).

1515. Check that VOM indicates 1M ohms or more. If not, repair or replace wiring and connectors as necessary; go to step 1517.

1516. Replace Electrometer Amplifier P.C. Board (5). Go to step 1518.

1517. Reinstall Electrometer Amplifier P.C. Board.

1518. Reinstall 110V Regulator P.C. Board.

1519. Go to step 1.

1520. Disconnect wire from switch terminal (13).

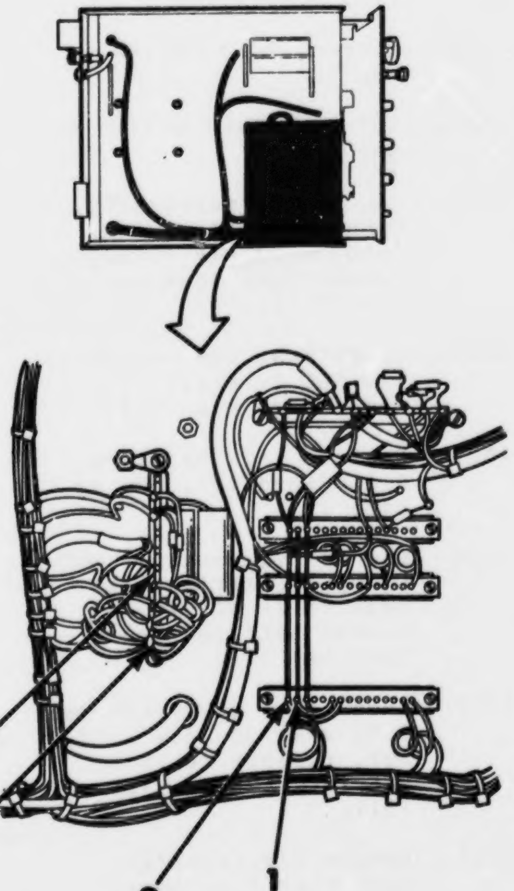
1521. Use VOM to measure OHMS. Connect positive test lead to switch terminal (13), common test lead to switch terminal (12).

1522. Check that VOM indicates 100K ohms or more. If not, replace MODE SELECT switch (11). Go to step 1.

1523. Repair or replace wiring and connectors as necessary.

1524. Reconnect wire to switch terminal (13).

1525. Go to step 1.



1526. Use VOM to measure VAC. Connect positive test lead to terminal (4), common test lead to terminal (3).

1527. Check that VOM indicates 100 VAC or more. If not, repair or replace wiring and connectors as necessary; go to step 1.

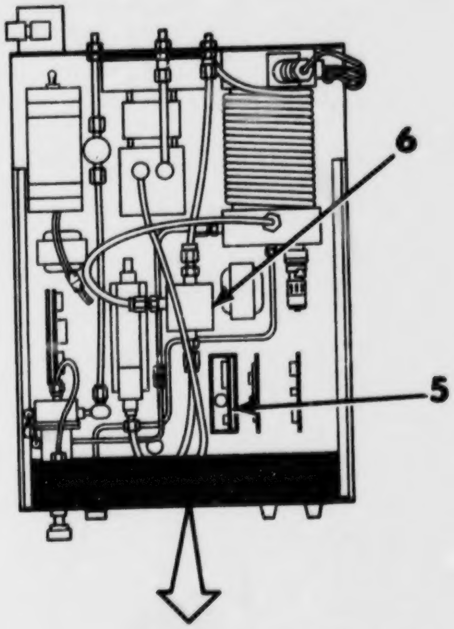
1528. Replace Selector Solenoid Valve (6). Go to step 1.

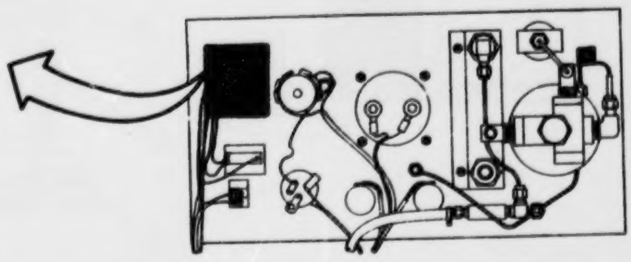
1529. Use VOM to measure OHMS. Connect positive test lead to switch terminal (10), common test lead to switch terminal (7).

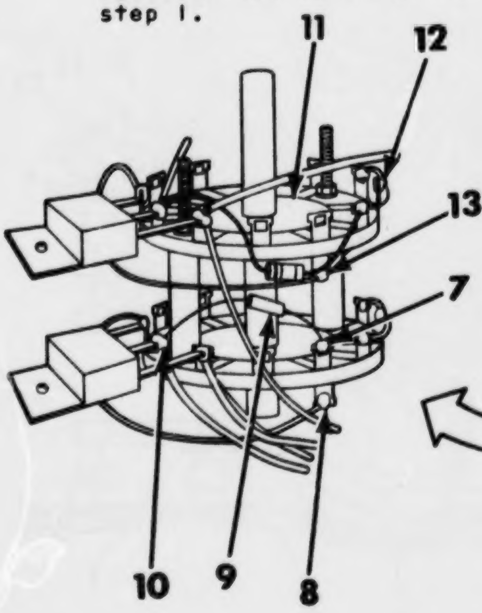
1530. Check that VOM indicates between .8 and 1.2K ohms. If not, replace resistor R20 (9). Go to step 1.

1531. Use VOM to measure OHMS. Connect positive test lead to switch terminal (7), common test lead to switch terminal (8).

1532. Check that VOM indicates 5 ohms or less. If not, replace MODE SELECT switch (11). Go to step 1.







1533. Repair or replace wiring and connectors as necessary. Go to step 1.

1534. Use VOM to measure VAC. Connect positive test lead to terminal (5), common test lead to terminal (6).

1535. Check that VOM indicates 100 VAC or more. If not, go to step 1548.

1536. Use VOM to measure VDC. Connect positive test lead to terminal (5), common test lead to terminal (8).

1537. Check that VOM indicates 120 VDC or more. If not, go to step 1551.

1538. Repair or replace wiring and connectors as necessary.

1539. Reinstall 110V Regulator p.C. Board.

1540. Go to step 1.

1541. Use VOM to measure VDC. Connect positive test lead to terminal (9), common test lead to terminal (5).

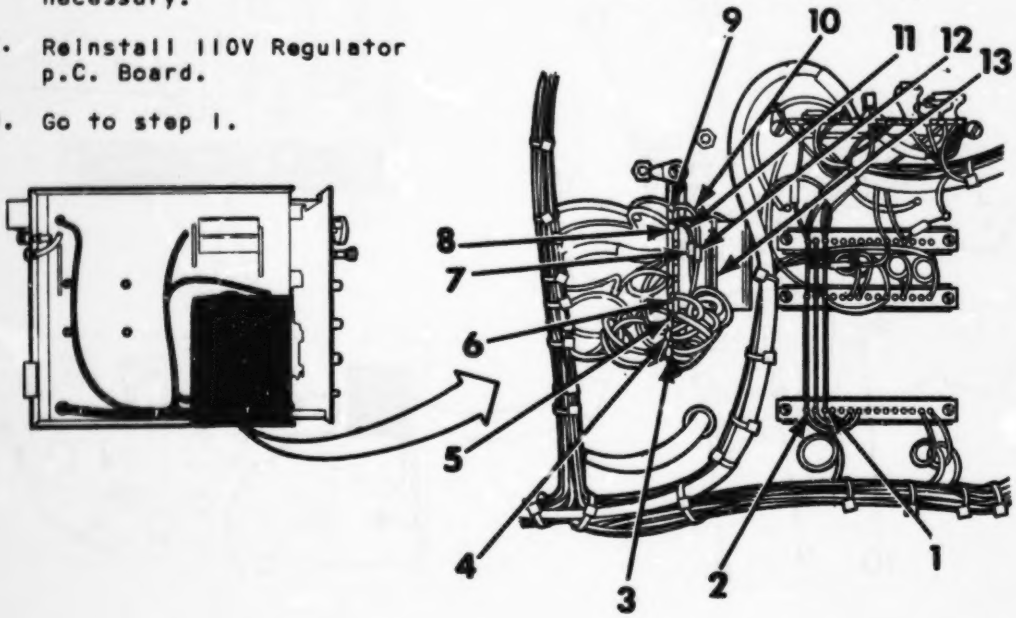
1542. Check that VOM indicates 120 VDC or more. If not, go to step 1561.

1543. Repair or replace wiring and connectors as necessary. Go to step 1570.

1544. Disconnect P6 (14) from detector cell.

1545. Use VOM to measure OHMS. Connect positive test lead to J3 pin 15 (2), common test lead to J3 pin 13 (1).

1546. Check that VOM indicates 20K ohms or more. If not, go to step 1570.



1547. Next, Replace Detector Cell Assembly, procedure begins at page 7-21 . Go on to step 1577 when finished.

1548. Use VOM to measure VAC. Connect positive test lead to terminal (4), common test lead to terminal (3).

1549. Check that VOM indicates 100 VAC or more. If not, go to step 1538.

1550. Replace transformer (15). Go to step 1539.

1551. Set the POWER switch to OFF.

1552. Disconnect AC power from monitor.

1553. Disconnect diode lead (11) from terminal.

1554. Use VOM to measure OHMS. Connect positive test lead to diode lead (11), common test lead to terminal (6).

1555. Check that VOM indicates 20 ohms or less. If not, replace diode CR1 (7). Go to step 1539.

1556. Use VOM to measure OHMS. Connect positive test lead to terminal (6), common test lead to diode lead (11).

1557. Check that VOM indicates 100K ohms or more. If not, replace diode CR1 (7). Go to step 1539.

1558. Replace capacitor C6 (13).

1559. Reconnect diode lead to terminal (8).

1560. Go to step 1539.

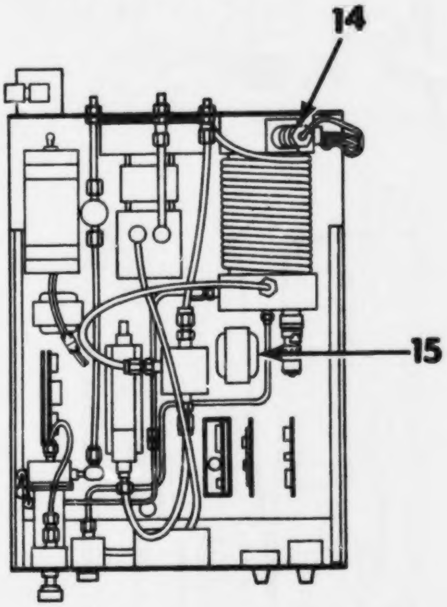
1561. Set the POWER switch to OFF.

1562. Disconnect AC power from monitor.

1563. Disconnect diode lead (10) from terminal.

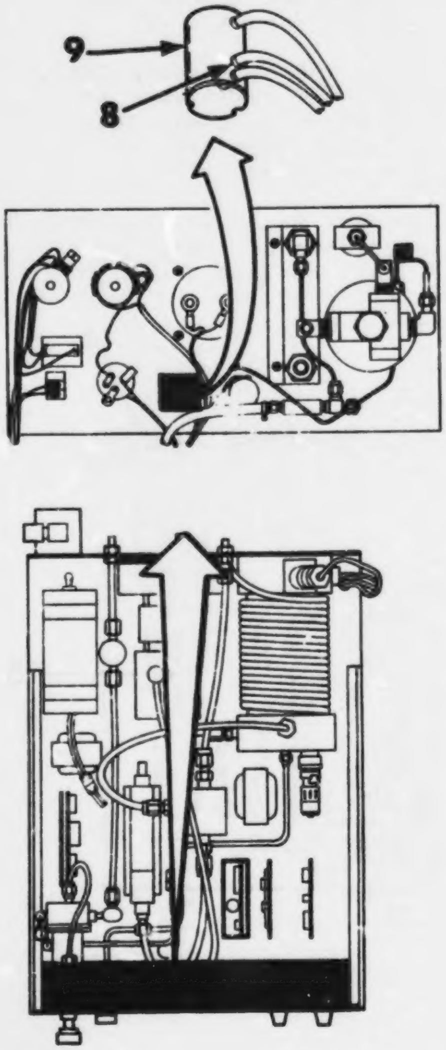
1564. Use VOM to measure OHMS. Connect positive test lead to terminal (6), common test lead to diode lead (10).

1565. Check that VOM indicates 20 ohms or less. If not, replace diode CR2 (12). Go to



1566. Use VOM to measure OHMS. Connect positive test lead to diode lead (6), common test lead to terminal (4).

1567. Check that VOM indicates 100K ohms or more. If not, replace diode CR2 (7). Go to step 1570 .



1568. Replace capacitor C7 (1).

1569. Reconnect diode lead to terminal (5).

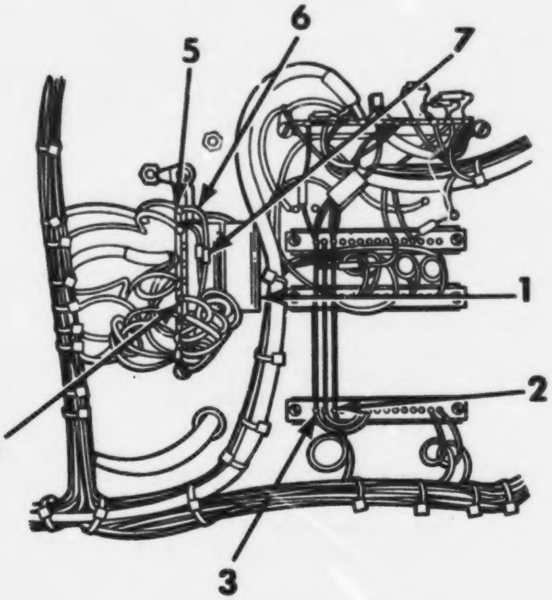
1570. Reinstall 110V Regulator P.C. Board.

1571. Go to step 1.

1572. Disconnect wire (8) from potentiometer.

1573. Use VOM to measure OHMS. Connect positive test lead to J3 pin 15 (3), common test lead to J3 pin 13 (2).

1574. Check that VOM indicates 35K ohms or more. If not, repair or replace wiring and connectors as necessary; go to step 1576.



1575. Replace Potentiometer R17 (9).

1576. Reinstall Electrometer Amplifier P.C. Board.

1577. Reinstall 110V Regulator P.C. Board.

1578. Go to step 1.

1579. Record ZERO ADJUST micrometer setting.

1580. Using ZERO ADJUST micrometer, adjust meter for 0. If unable to adjust for 0, go to step 1582.

1581. Go to step 38.

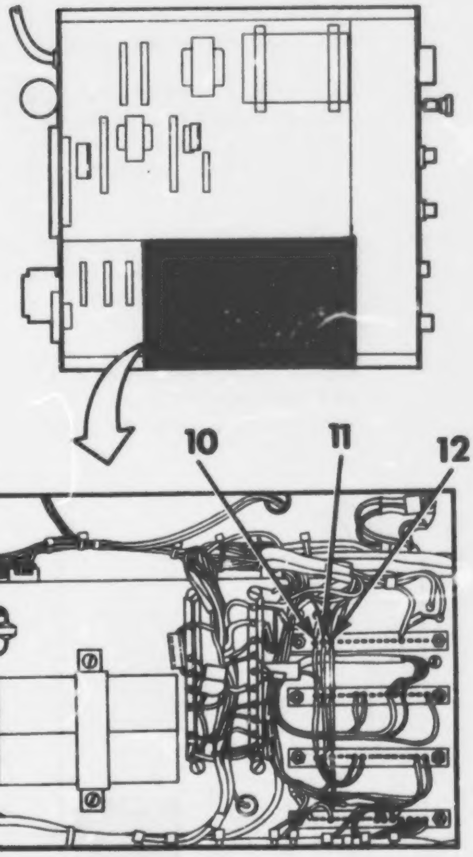
1582. Use VOM to measure VDC. Connect positive test lead to J1 pin 13 (12), common test lead to J1 pin 14 (11).

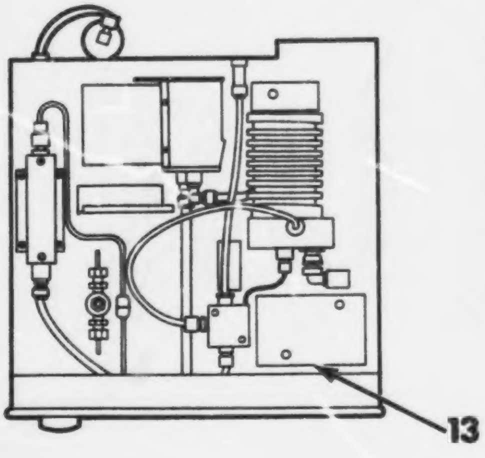
1583. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1591.

1584. Use VOM to measure VDC. Connect positive test lead to J1 pin 15 (10), common test lead to J1 pin 13 (12).

1585. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1595.

1586. Remove cover (13).





1587. Interchange Electrometer Amplifier PC Board (2) with a new one.

1588. Check that O3 CONCENTRATION meter (1) indicates 0 within 1 minute. If not, go to step 1599.

1589. Go to step 1.

1590. Reinstall cover.

1591. Check that VOM indication was low. If not, go to step 1607.

1592. Use VOM to measure VDC. Connect positive test lead to J3 pin 13 (3), common test lead to J3 pin 14 (5).

1593. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1612.

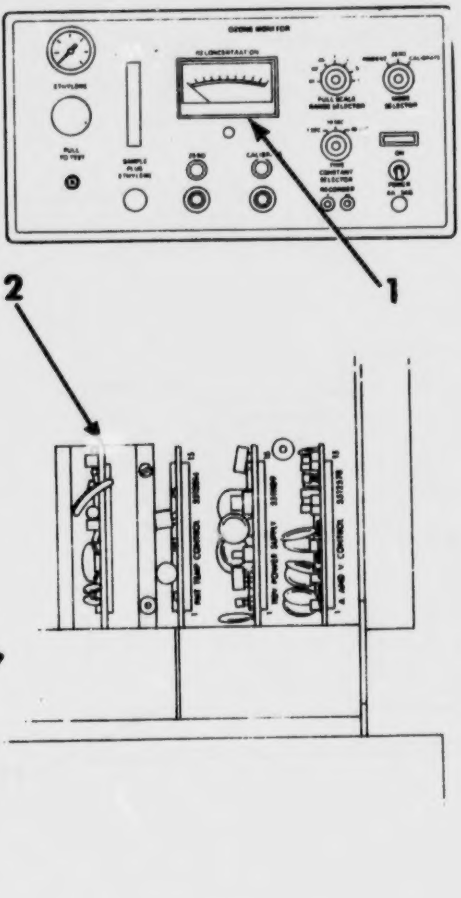
1594. Repair or replace wiring and connectors as necessary. Go to step 1.

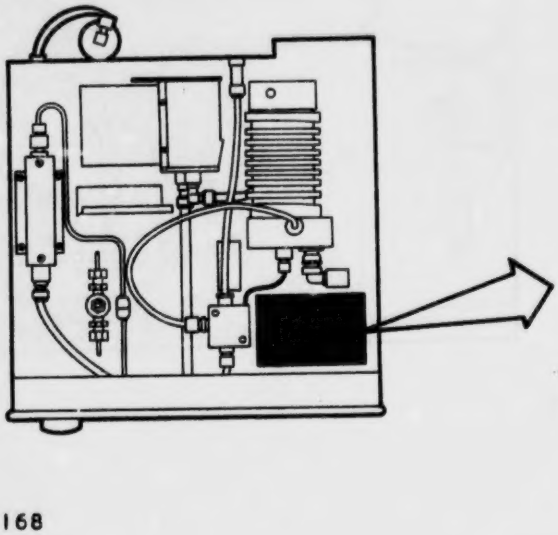
1595. Check that VOM indication was low. If not, go to step 1623.

1596. Use VOM to measure VDC. Connect positive test lead to J3 pin 15 (4), common test lead to J3 pin 13 (3).

1597. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1631.

1598. Repair or replace wiring and connectors as necessary. Go to step 1.





1599. Remove new Electrometer Amplifier PC Board (2) from monitor, reinstall old PC Board.

1600. Reinstall cover.

1601. Check that O3 CONCENTRATION meter needle is pegged left. If not, go to step 1642.

1602. Use VOM to measure VDC. Connect positive test lead to terminal (6), common test lead to terminal (7).

1603. Check that VOM indicates 1 VDC or less. If not, go to step 1649.

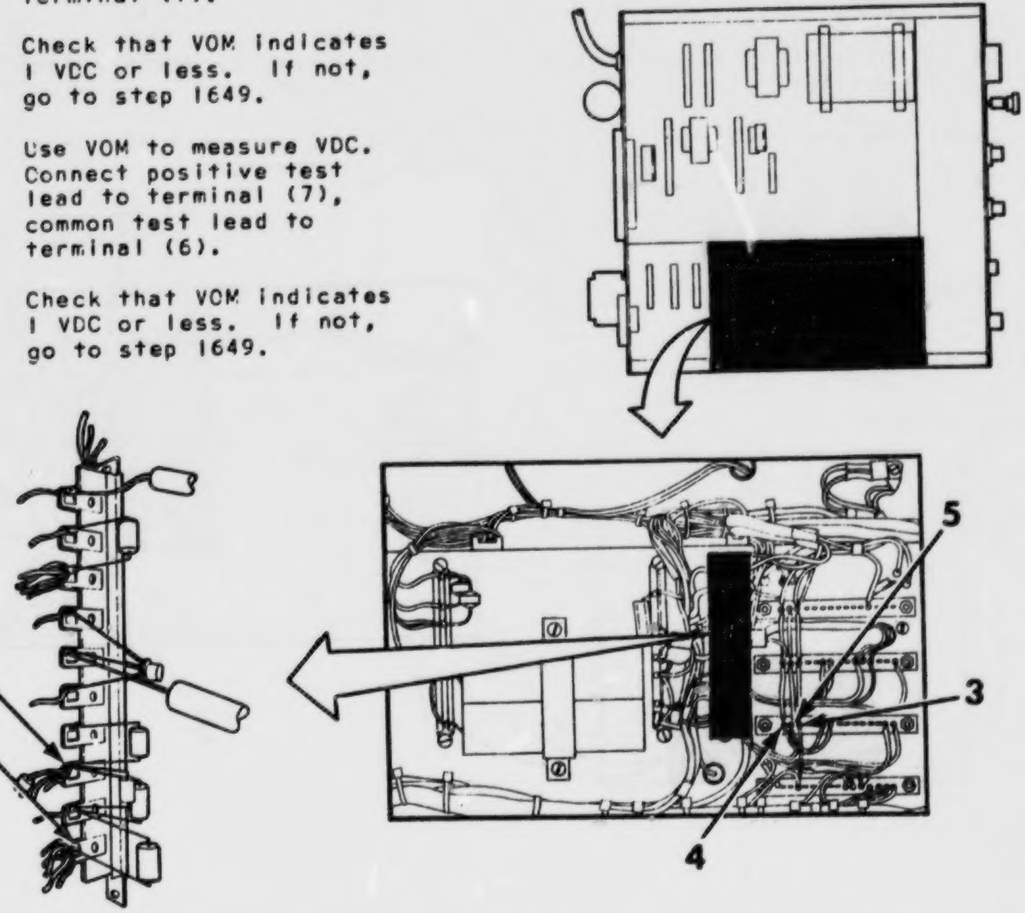
1604. Use VOM to measure VDC. Connect positive test lead to terminal (7), common test lead to terminal (6).

1605. Check that VOM indicates 1 VDC or less. If not, go to step 1649.

1606. Replace O3 CONCENTRATION meter (1). Go to step 1.

1607. Set the POWER switch to OFF.

1608. Disconnect AC power from monitor.



1609. Use VOM to measure OHMS. Connect positive test lead to J3 pin 10 (5), common test lead to J3 pin 14 (3).

1610. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 1.

1611. Replace 110V Regulator P.C. Board (7). Go to step 1.

1612. Set the POWER switch to OFF.

1613. Disconnect AC power from monitor.

1614. Remove cover (8).

1615. Remove Electrometer Amplifier P.C. Board (6).

1616. Connect AC power to monitor.

1617. Set the POWER switch to ON.

1618. Use VOM to measure VDC. Connect positive test lead to J3 pin 13 (4), common test lead to J3 pin 14 (3).

1619. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1687.

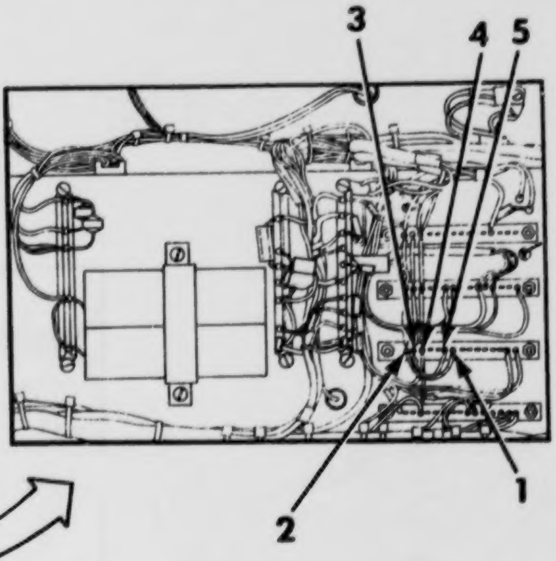
1620. Replace Electrometer Amplifier P.C. Board (6).

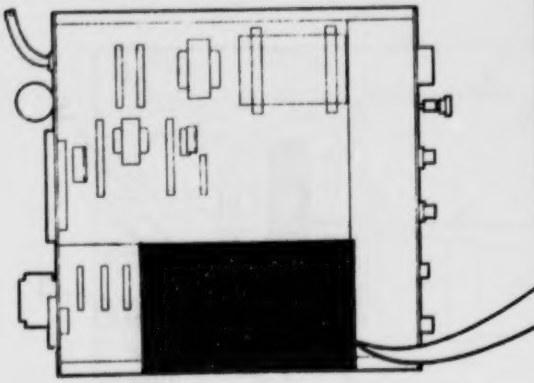
1621. Reinstall cover.

1622. Go to step 1.

1623. Set the POWER switch to OFF.

1624. Disconnect AC power from monitor.





1625. Use VOM to measure OHMS. Connect positive test lead to J3 pin 9 (1), common test lead to J3 pin 15 (2).

1626. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 1.

1627. Remove cover (8).

1628. Replace 110V Regulator P.C. Board (7). Go to step 1.

1629. Reinstall cover.

1630. Go to step 1.

1631. Set the POWER switch to OFF.

1632. Disconnect AC power from monitor.

1633. Remove cover (8).

1634. Remove Electrometer Amplifier P.C. Board (6).

1635. Connect AC power to monitor.

1636. Set the POWER switch to ON.

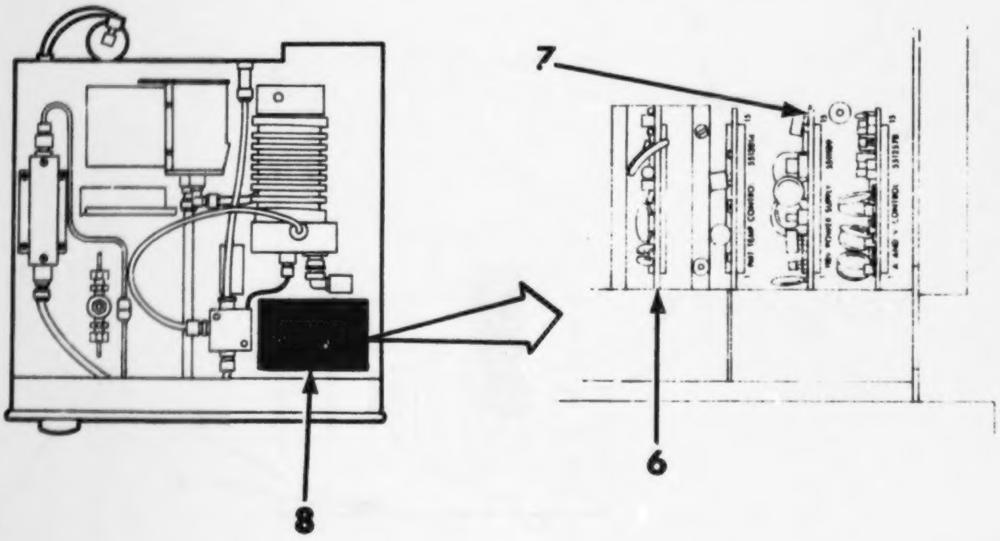
1637. Use VOM to measure VDC. Connect positive test lead to J3 pin 15 (2), common test lead to J3 pin 13 (4).

1638. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1700.

1639. Replace Electrometer Amplifier P.C. Board (6).

1640. Reinstall cover.

1641. Go to step 1.



1642. Check that ultraviolet lamp (4) is not lit. If lit, go to step 1715.

1643. Disconnect SAMPLE INLET (1) and check that O3 CONCENTRATION meter indication is uneffected. If effected, go to step 1715.

1644. Disconnect P7 (3) from detector cell.

1645. Check that O3 CONCENTRATION meter (5) indicates 0 within 1 minute. If not, go to step 1647.

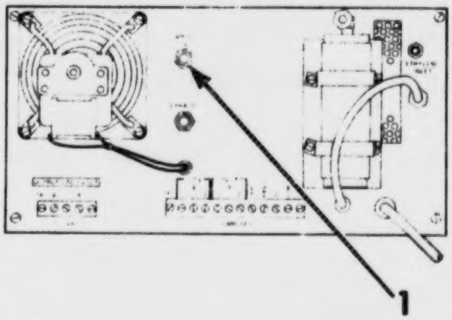
1646. Next, Replace Detector Cell Assembly, procedure begins at page 7-21 . Go on to step 1 when finished.

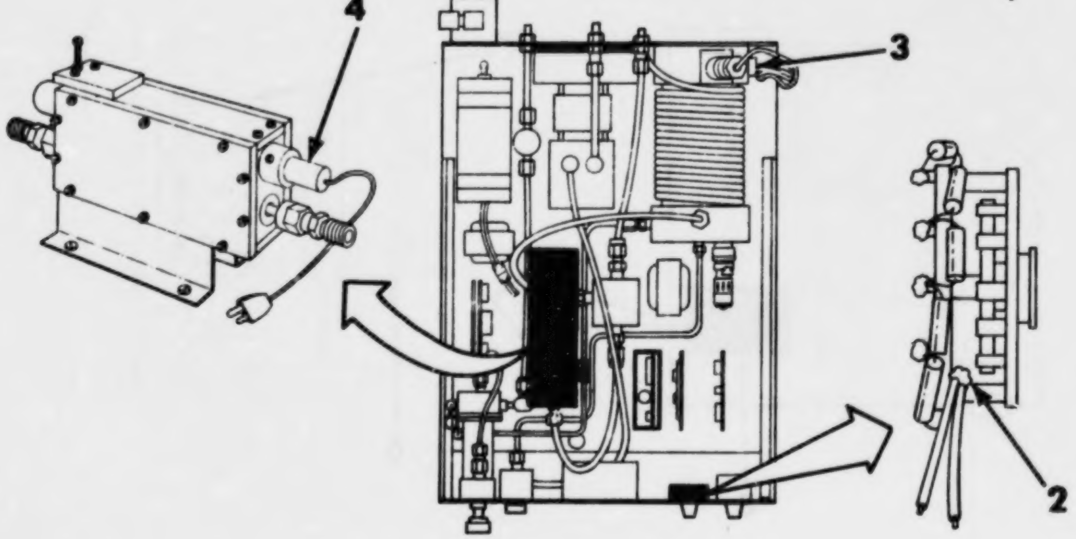
1647. Reconnect P7 to detector cell.

1648. Go to step 1602.

1649. Use VOM to measure VDC. Connect positive test lead to potentiometer terminal (7), common test lead to potentiometer terminal (6).

1650. Check that VOM indicates between 105 and 115 VDC. If not, repair or replace wiring and connectors as necessary; go to step 1.





1651. Set the POWER switch to OFF.

1652. Disconnect AC power from monitor.

1653. Disconnect and tag lead (9).

1654. Disconnect and tag lead (8).

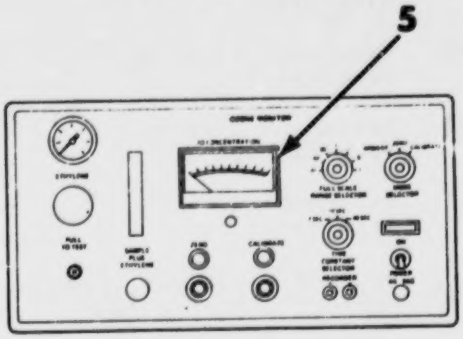
1655. Disconnect and tag lead (2).

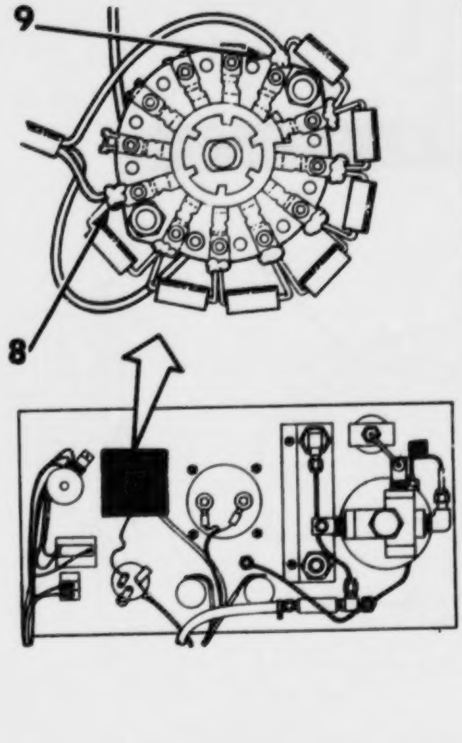
1656. Use VOM to measure OHMS. Connect positive test lead to resistor lead (9), common test lead to resistor lead (8).

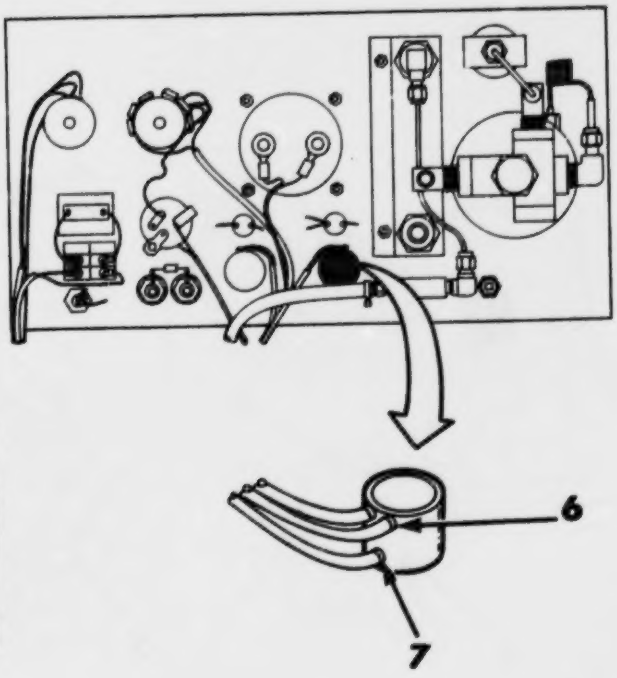
1657. Check that VOM indicates between 95 and 100K ohms. If not, go to step 2491.

1658. Use VOM to measure OHMS. Connect positive test lead to terminal (2), common test lead to terminal (9).

1659. Check that VOM indicates 5 ohms or less. If not, go to step 2490.


5
OZONE MONITOR
ZERO
CALIBRATE
FULL SCALE RANGE SELECTOR
TIME CONSTANT SELECTOR
RECORDER
POWER





1660. Use VOM to measure OHMS. Connect positive test lead to terminal (1), common test lead to terminal (2).

1661. Check that VOM indicates between 95 and 105K ohms. If not, go to step 2490.

1662. Reconnect wire to terminal (3).

1663. Reconnect wire to terminal (2).

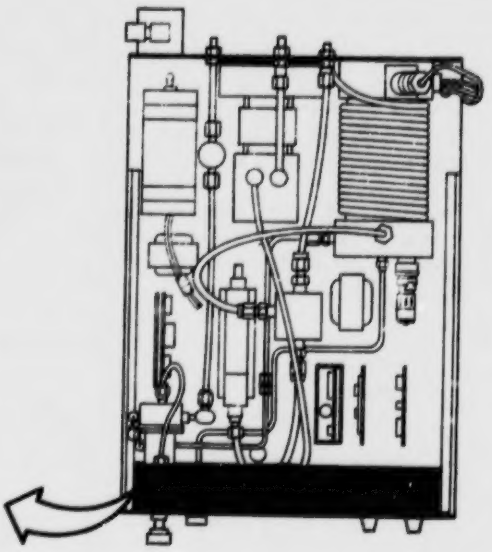
1664. Reconnect wire to terminal (1).

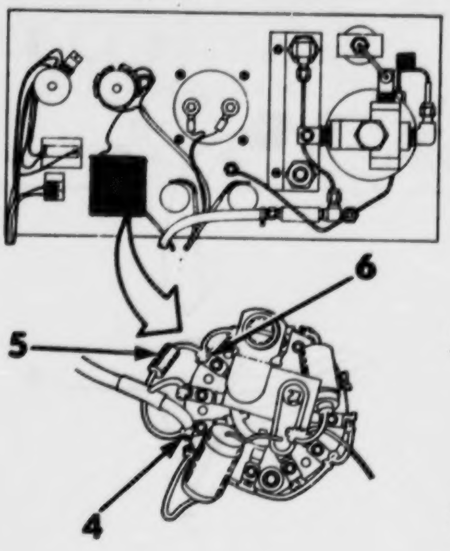
1665. Use VOM to measure OHMS. Connect positive test lead to terminal (6), common test lead to terminal (4).

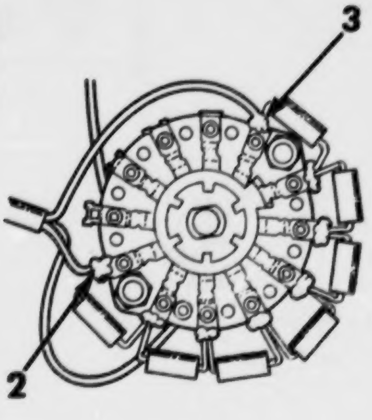
1666. Check that VOM indicates between .9 and 1.1M ohms. If not, replace resistor R12 (5). Go to step 1.

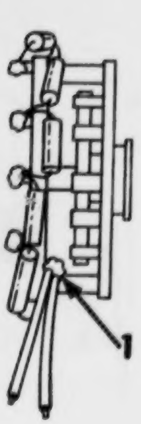
1667. Use VOM to measure OHMS. Connect positive test lead to terminal (7), common test lead to terminal (8).

1668. Check that VOM indicates between 9.5 and 10.5K ohms. If not, replace resistor R15 (9). Go to step 1.









1669. Disconnect wire from terminal (11).

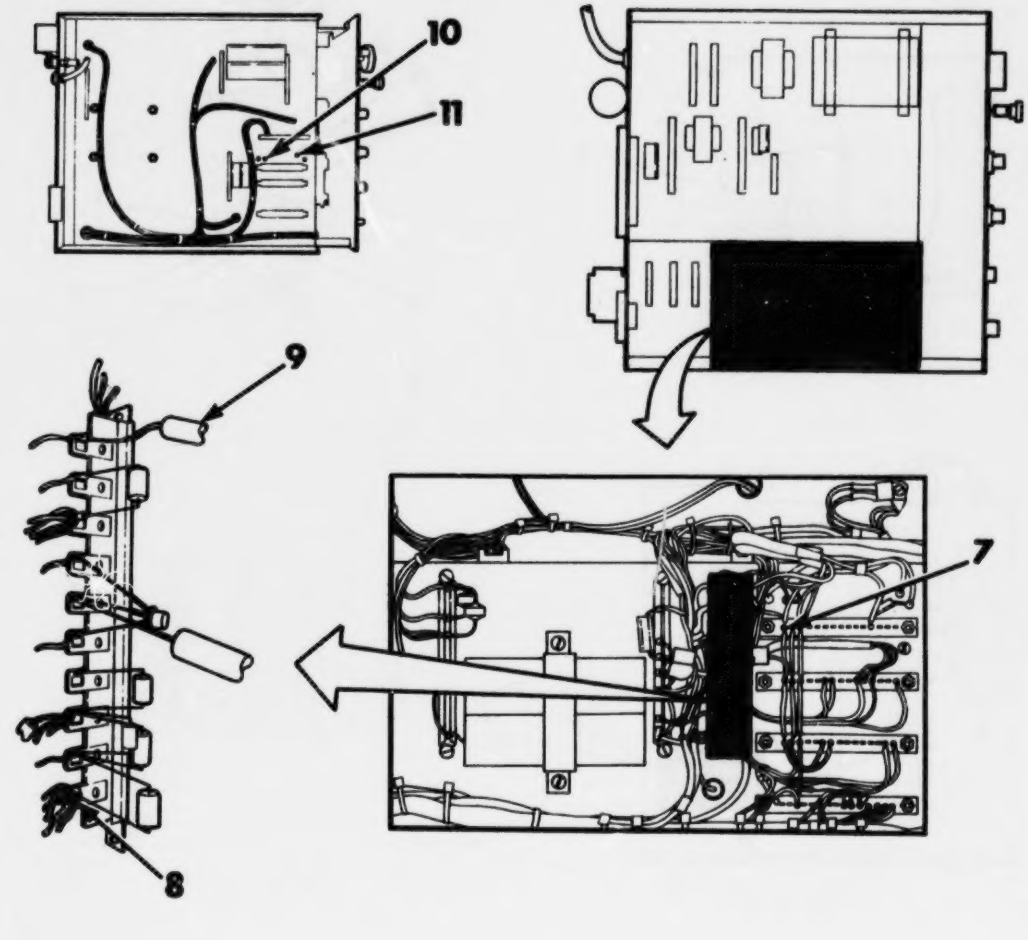
NOTE

In the next step a very large resistance is to be measured. This resistance is beyond the range of most VOMS. Consider the check good if the indication is as high as the VOM will indicate.

1670. Use VOM to measure OHMS. Connect positive test lead to terminal (11), common test lead to terminal (10).

1671. Check that VOM indicates infinity. If not, go to step 1682.

1672. Reconnect wire to terminal (11).

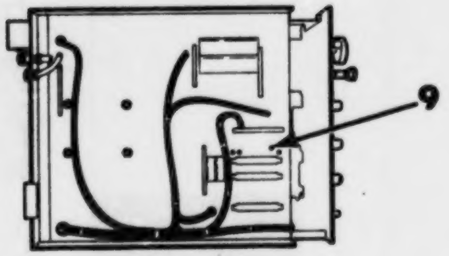


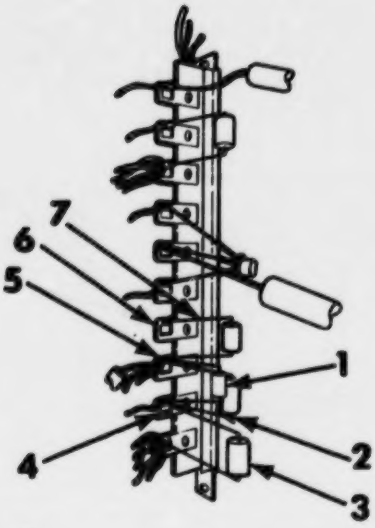
1673. Disconnect resistor lead (2) from terminal.

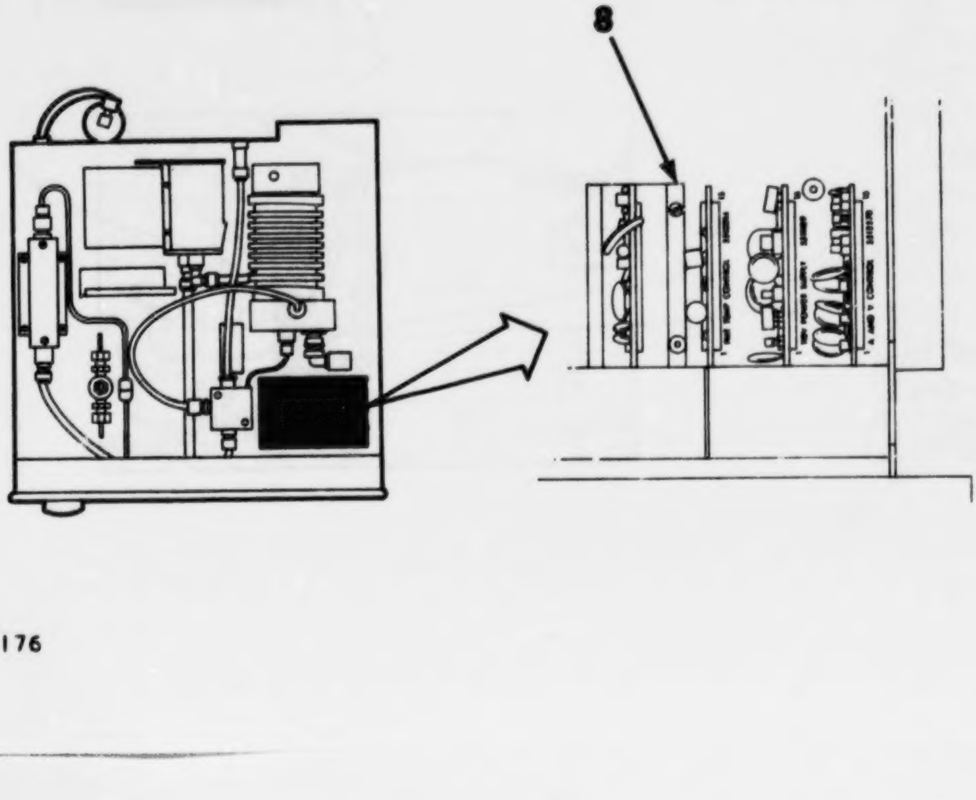
1674. Use VOM to measure OHMS. Connect positive test lead to resistor lead (2), common test lead to terminal (5).

1675. Check that VOM indicates between 15 and 25M ohms. If not, replace resistor R22 (3). Go to step 1.

1676. Reconnect resistor lead to terminal (4).







1677. Disconnect resistor lead (7) from terminal.

1678. Use VOM to measure OHMS. Connect positive test lead to resistor lead (7), common test lead to terminal (5).

1679. Check that VOM indicates between .9 and 1.1M ohms. If not, replace resistor R4 (1). Go to step 1.

1680. Reconnect resistor lead to terminal (6).

1681. Repair or replace wiring and connectors as necessary. Go to step 1.

1682. Remove P.C. board shield (8).

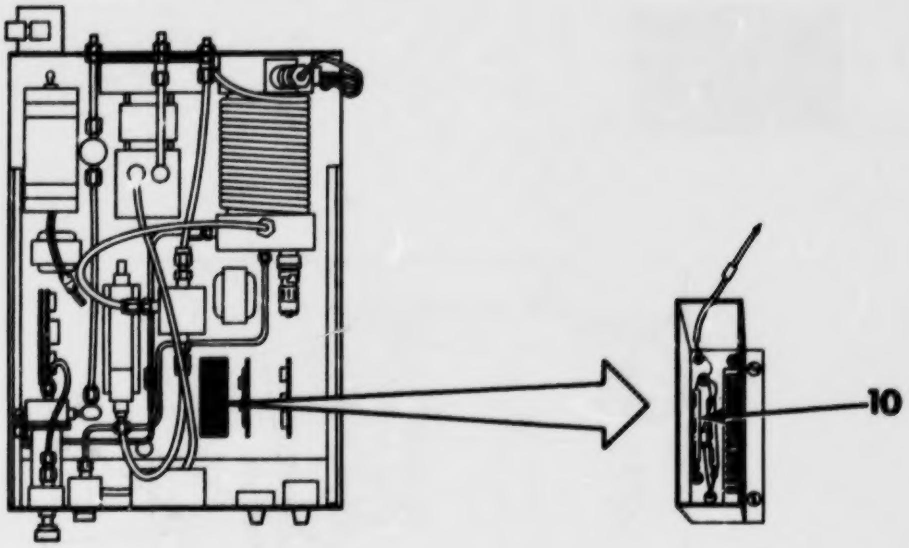
1683. Replace resistor R18 (10).

1684. Reinstall P.C. board shield.

1685. Reconnect wire to terminal (9).

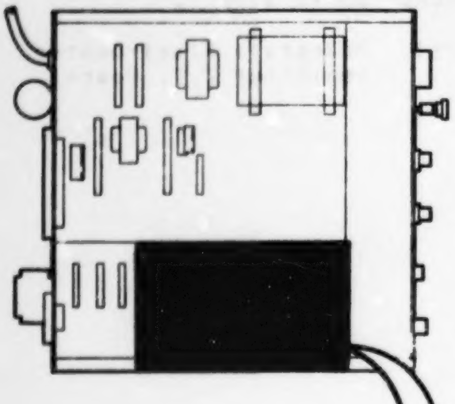
1686. Go to step 1.

1687. Reinstall Electrometer Amplifier P.C. Board.



1688. Use VOM to measure VDC. Connect positive test lead to J3 pin 13 (4), common test lead to J3 pin 2 (5).

1689. Check that VOM indicates 120 VDC or more. If not, go to step 1734.



1690. Set the POWER switch to OFF.

1691. Disconnect AC power from monitor.

1692. Remove 110V Regulator P.C. Board (6).

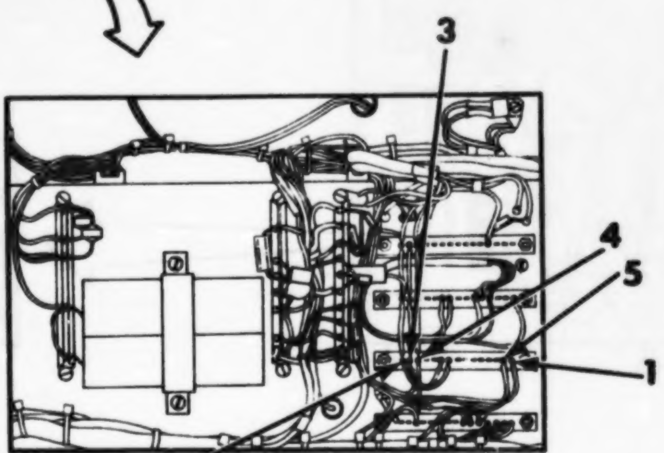
1693. Use VOM to measure OHMS. Connect positive test lead to J3 pin 14 (3), common test lead to J3 pin 13 (4).

1694. Check that VOM indicates 40K ohms or more. If not, go to step 1744.

1695. Use VOM to measure OHMS. Connect positive test lead to J3 pin 14 (3), common test lead to J3 pin 15 (2).

1696. Check that VOM indicates 50K ohms or more. If not, go to step 1752.

1697. Replace 110V Regulator P.C. Board (6).



1698. Reinstall cover.

1699. Go to step 1.

1700. Set the POWER switch to OFF.

1701. Reinstall Electrometer Amplifier P.C. Board.

1702. Set the POWER switch to ON.

1703. Use VOM to measure VDC. Connect positive test lead to J3 pin 1 (1), common test lead to J3 pin 13 (4).

1704. Check that VOM indicates 120 VDC or more. If not, go to step 1760.

1705. Set the POWER switch to OFF.

1706. Disconnect AC power from monitor.

1707. Remove 110V Regulator P.C. Board (6).

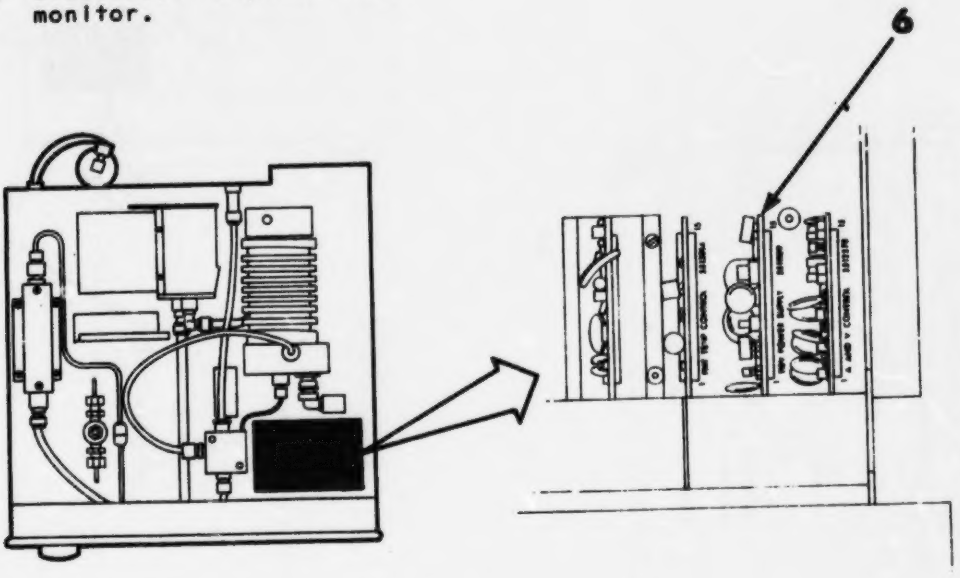
1708. Use VOM to measure OHMS. Connect positive test lead to J3 pin 15 (2), common test lead to J3 pin 13 (4).

1709. Check that VOM indicates 20K ohms or more. If not, go to step 1770.

1710. Use VOM to measure OHMS. Connect positive test lead to J3 pin 15 (2), common test lead to J3 pin 14 (3).

1711. Check that VOM indicates 50K ohms or more. If not, go to step 1779.

1712. Replace 110V Regulator P.C. Board (6).



1713. Reinstall cover.

1714. Go to step 1.

1715. Remove cover (1).

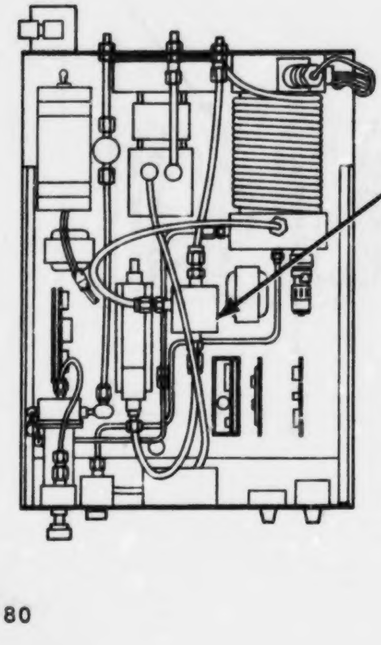
1716. Remove Alarm and Valve Control P.C. Board (2).

1717. Use VOM to measure VAC. Connect positive test lead to J4 pin 2 (8), common test lead to terminal (4).

1718. Check that VOM indicates 5 VAC or less. If not, replace Alarm and Valve Control P.C. Board (2). Go to step 1721.

1719. Repair or replace wiring and connectors as necessary.

1720. Reinstall Alarm and Valve Control P.C. Board.

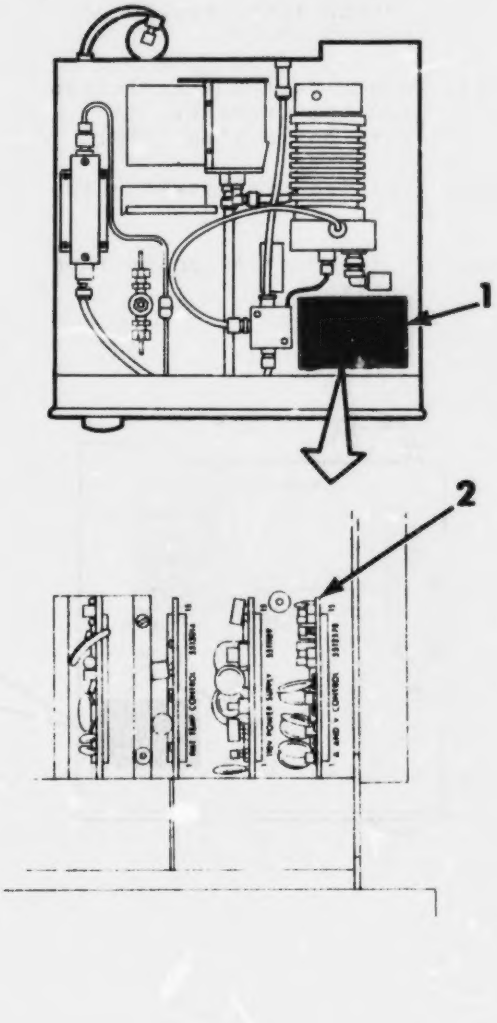


1721. Reinstall cover.

1722. Go to step 1.

1723. Use VOM to measure VAC. Connect positive test lead to J4 pin 3 (7), common test lead to terminal (4).

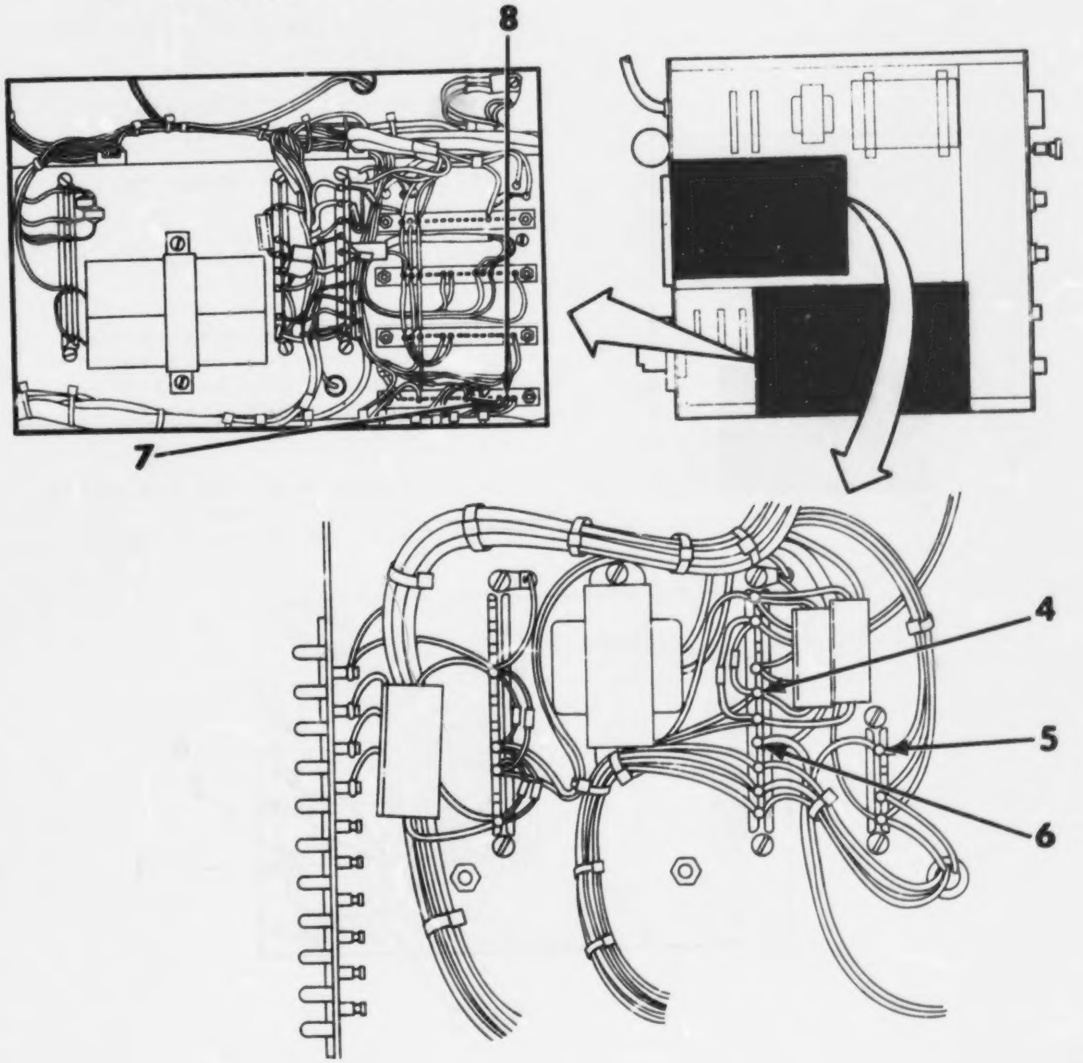
1724. Check that VOM indicates 100 VAC or more. If not, go to step 1728.



1725. Use VOM to measure VAC. Connect positive test lead to terminal (5), common test lead to terminal (6).

1726. Check that VOM indicates 100 VAC or more. If not, repair or replace wiring and connectors as necessary; go to step 1.

1727. Replace Selector Solenoid Valve (3). Go to step 1.



1728. Use VOM to measure VDC. Connect positive test lead to J4 pin 6 (2), common test lead to J4 pin 13 (3).

1729. Check that VOM indicates 10 VDC or more. If not, repair or replace wiring and connectors as necessary; go to step 1.

1730. Remove cover (11).

1731. Replace Alarm and Valve Control P.C. Board (10).

1732. Reinstall cover.

1733. Go to step 1.

1734. Set the POWER switch to OFF.

1735. Disconnect AC power from monitor.

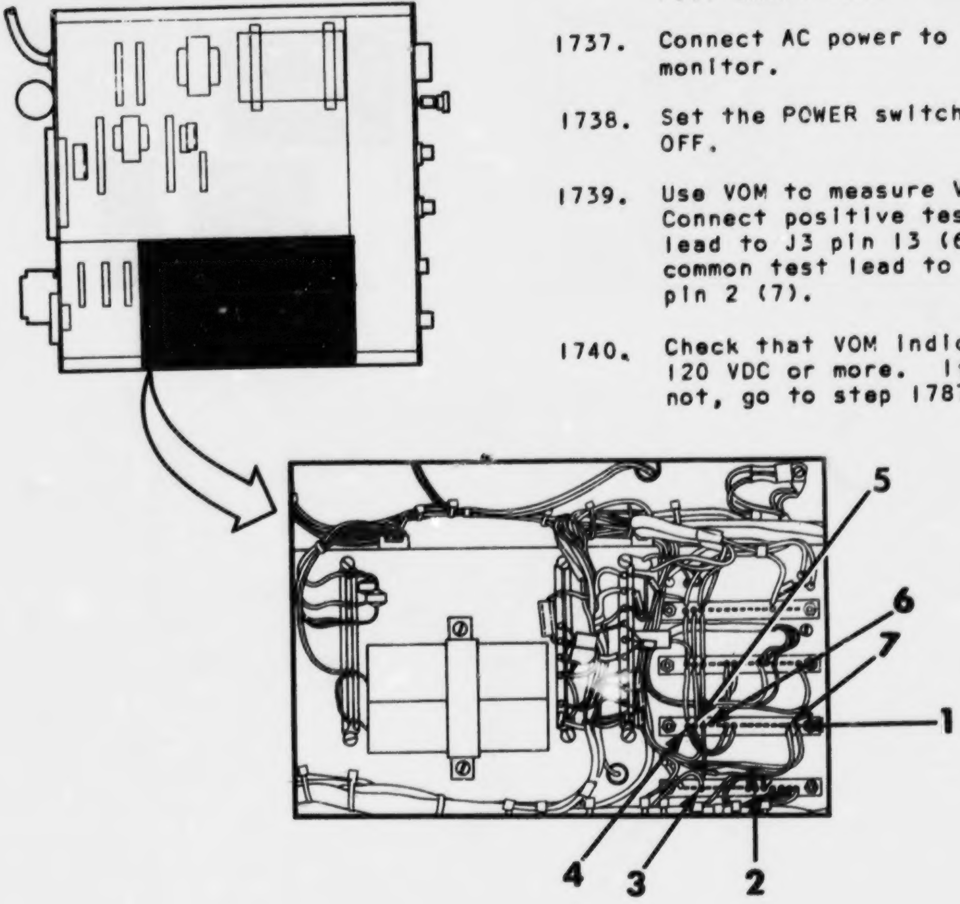
1736. Remove 110V Regulator P.C. Board (9).

1737. Connect AC power to monitor.

1738. Set the POWER switch to OFF.

1739. Use VOM to measure VDC. Connect positive test lead to J3 pin 13 (6), common test lead to J3 pin 2 (7).

1740. Check that VOM indicates 120 VDC or more. If not, go to step 1787.



1741. Replace 110V Regulator P.C. Board (9).

1742. Reinstall cover.

1743. Go to step 1.

1744. Remove Electrometer Amplifier P.C. Board (8).

1745. Use VOM to measure OHMS. Connect positive test lead to J3 pin 14 (5), common test lead to J3 pin 1 (1).

1746. Check that VOM indicates 1M ohm or more. If not, repair or replace wiring and connectors as necessary; go to step 1748.

1747. Replace Electrometer Amplifier P.C. Board (8). Go to step 1749.

1748. Reinstall Electrometer Amplifier P.C. Board.

1749. Reinstall 110V Regulator P.C. Board.

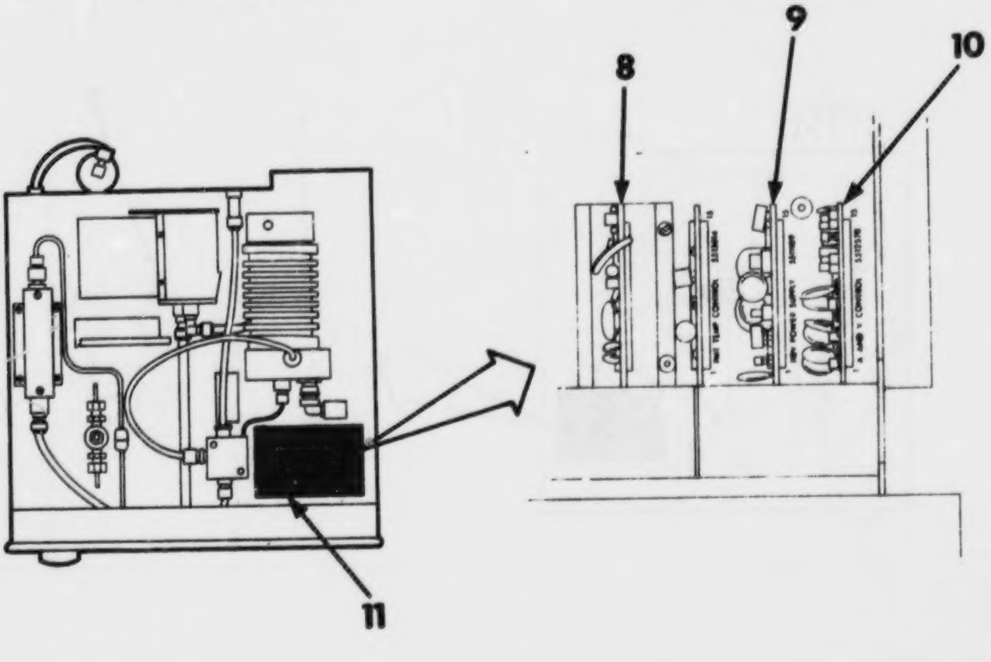
1750. Reinstall cover.

1751. Go to step 1.

1752. Remove Electrometer Amplifier P.C. Board (8).

1753. Use VOM to measure OHMS. Connect positive test lead to J3 pin 14 (5), common test lead to J3 pin 15 (4).

1754. Check that VOM indicates 1M ohms or more. If not, repair or replace wiring and connectors as necessary; go to step 1756.



1755. Replace Electrometer Amplifier P.C. Board (1). Go to step 1757.

1756. Reinstall Electrometer Amplifier P.C. Board.

1757. Reinstall 110V Regulator P.C. Board.

1758. Reinstall cover.

1759. Go to step 1.

1760. Set the POWER switch to OFF.

1761. Disconnect AC power from monitor.

1762. Remove 110V Regulator P.C. Board (2).

1763. Connect AC power to monitor.

1764. Set the POWER switch to ON.

1765. Use VOM to measure VDC. Connect positive test lead to J3 pin 1 (5), common test lead to J3 pin 13 (9).

1766. Check that VOM indicates 120 VDC or more. If not, go to step 1794.

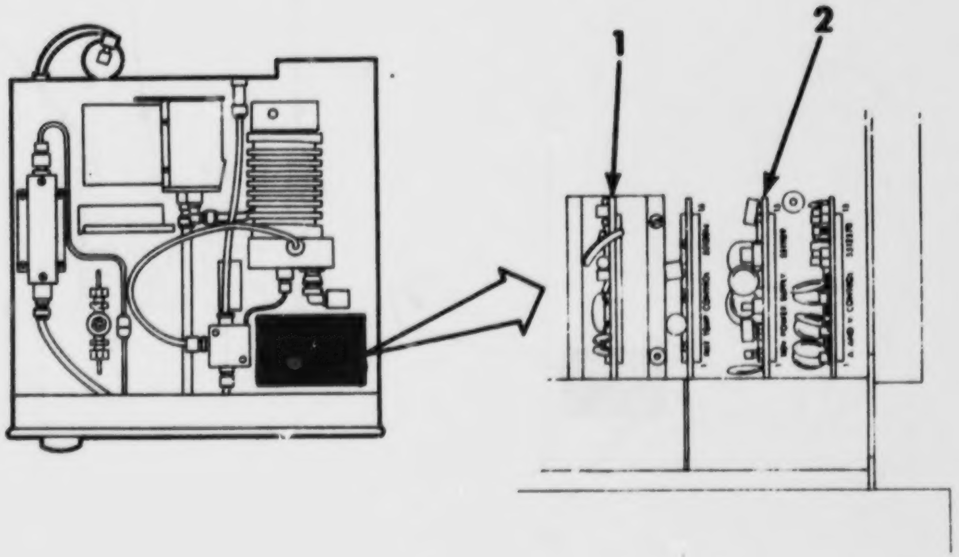
1767. Replace 110V Regulator P.C. Board (2).

1768. Reinstall cover.

1769. Go to step 1.

1770. Use VOM to measure OHMS. Connect positive test lead to J1 pin 15 (8), common test lead to terminal (4).

1771. Check that VOM indicates 2.5K ohms or more. If not, replace resistor R16 (3). Go to step 1776.



1772. Remove Electrometer Amplifier P.C. Board (1).

1773. Use VOM to measure OHMS. Connect positive test lead to J3 pin 15 (7), common test lead to J3 pin 13 (9).

1774. Check that VOM indicates 20K ohms or more. If not, go to step 1797.

1775. Replace Electrometer Amplifier P.C. Board (1).

1776. Reinstall 110V Regulator P.C. Board.

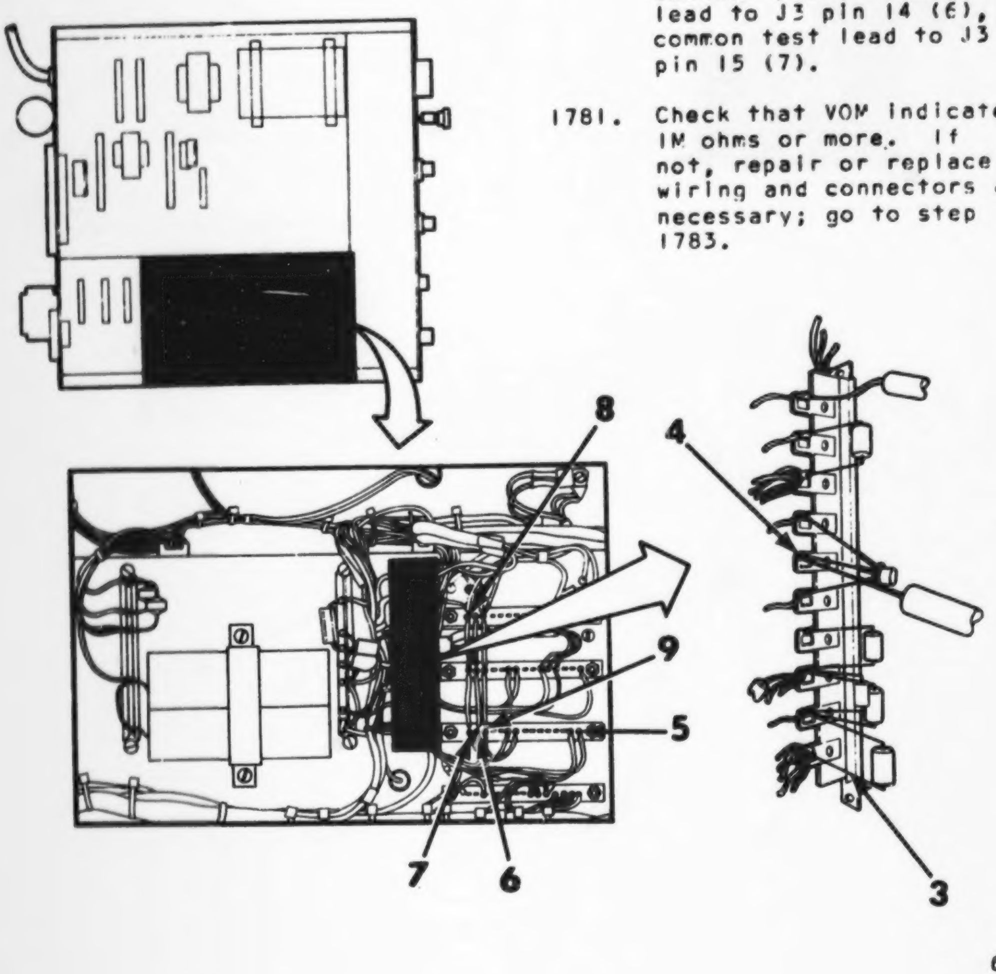
1777. Reinstall cover.

1778. Go to step 1.

1779. Remove Electrometer Amplifier P.C. Board (1).

1780. Use VOM to measure OHMS. Connect positive test lead to J3 pin 14 (6), common test lead to J3 pin 15 (7).

1781. Check that VOM indicates 1M ohms or more. If not, repair or replace wiring and connectors as necessary; go to step 1783.

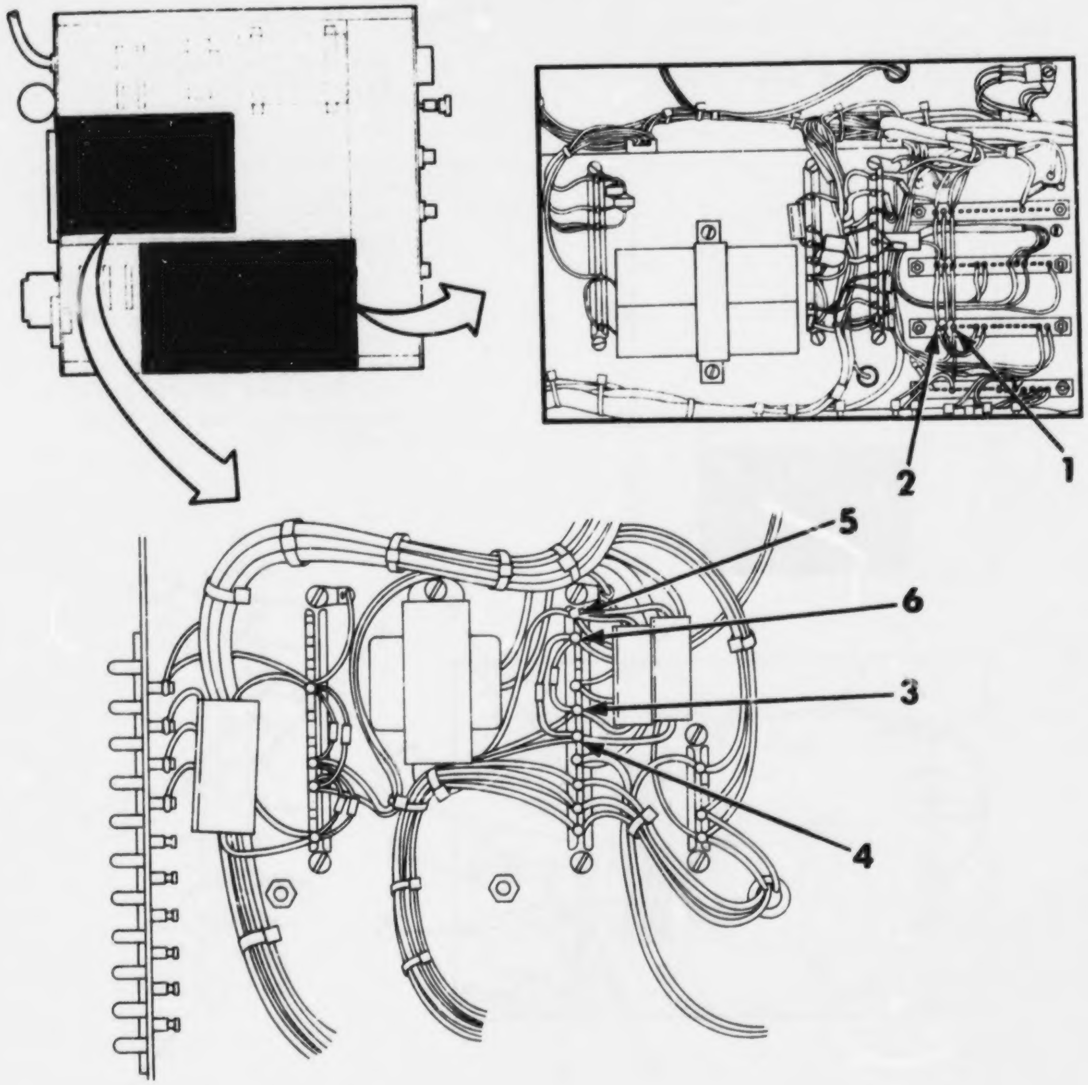


1782. Replace Electrometer Amplifier P.C. Board (8). Go to step 1784.

1783. Reinstall Electrometer Amplifier P.C. Board.

1784. Reinstall 110V Regulator P.C. Board.

1785. Reinstall cover.



1786. Go to step 1.

1787. Use VOM to measure VAC. Connect positive test lead to terminal (5), common test lead to terminal (6).

1788. Check that VOM indicates 100 VAC or more. If not, go to step 1801.

1789. Use VOM to measure VDC. Connect positive test lead to terminal (3), common test lead to terminal (5).

1790. Check that VOM indicates 120 VDC or more. If not, go to step 1804.

1791. Repair or replace wiring and connectors as necessary.

1792. Reinstall 110V Regulator P.C. Board.

1793. Go to step 1.

1794. Use VOM to measure VDC. Connect positive test lead to terminal (5), common test lead to terminal (4).

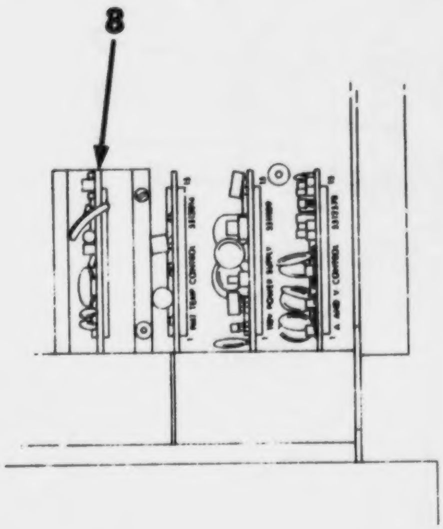
1795. Check that VOM indicates 120 VDC or more. If not, go to step 1814.

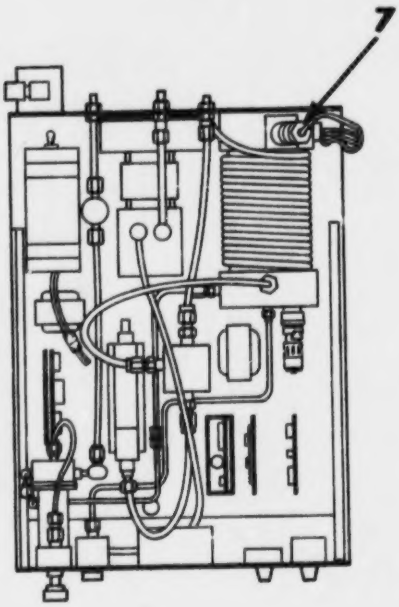
1796. Repair or replace wiring and connectors as necessary. Go to step 1823.

1797. Disconnect P6 (7) from detector cell.

1798. Use VOM to measure OHMS. Connect positive test lead to J3 pin 15 (2), common test lead to J3 pin 13 (1).

1799. Check that VOM indicates 20K ohms or more. If not, go to step 1823.





1800. Next, Replace Detector Cell Assembly, procedure begins at step 7-21. Go on to step 1831 when finished.

1801. Use VOM to measure VAC. Connect positive test lead to terminal (8), common test lead to terminal (2).

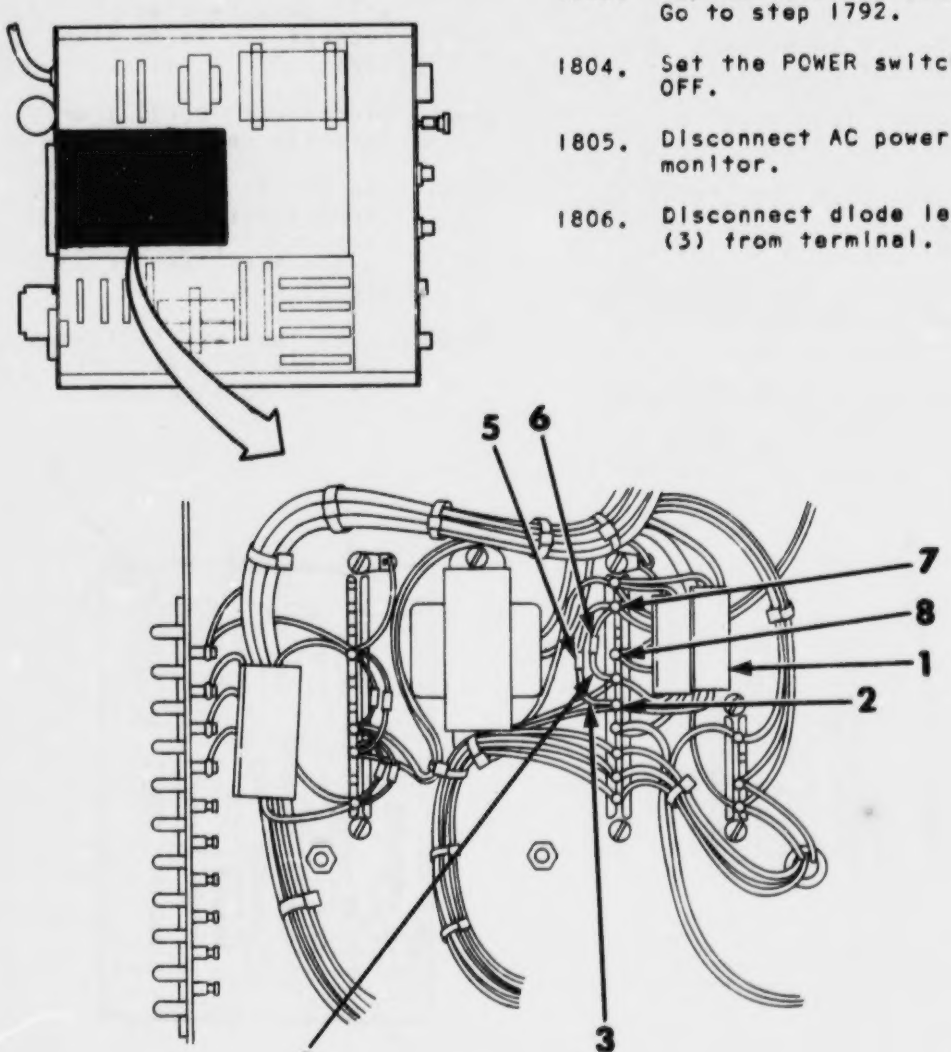
1802. Check that VOM indicates 100 VAC or more. If not, go to step 1791.

1803. Replace transformer (9). Go to step 1792.

1804. Set the POWER switch to OFF.

1805. Disconnect AC power from monitor.

1806. Disconnect diode lead (3) from terminal.



1807. Use VOM to measure OHMS. Connect positive test lead to diode lead (3), common test lead to terminal (7).

1808. Check that VOM indicates 20 ohms or less. If not, replace diode CR1 (5). Go to step 1792.

1809. Use VOM to measure OHMS. Connect positive test lead to terminal (7), common test lead to diode lead (3).

1810. Check that VOM indicates 100K ohms or more. If not, replace diode CR1 (5). Go to step 1792.

1811. Replace capacitor C6 (1).

1812. Reconnect diode lead to terminal (2).

1813. Go to step 1792.

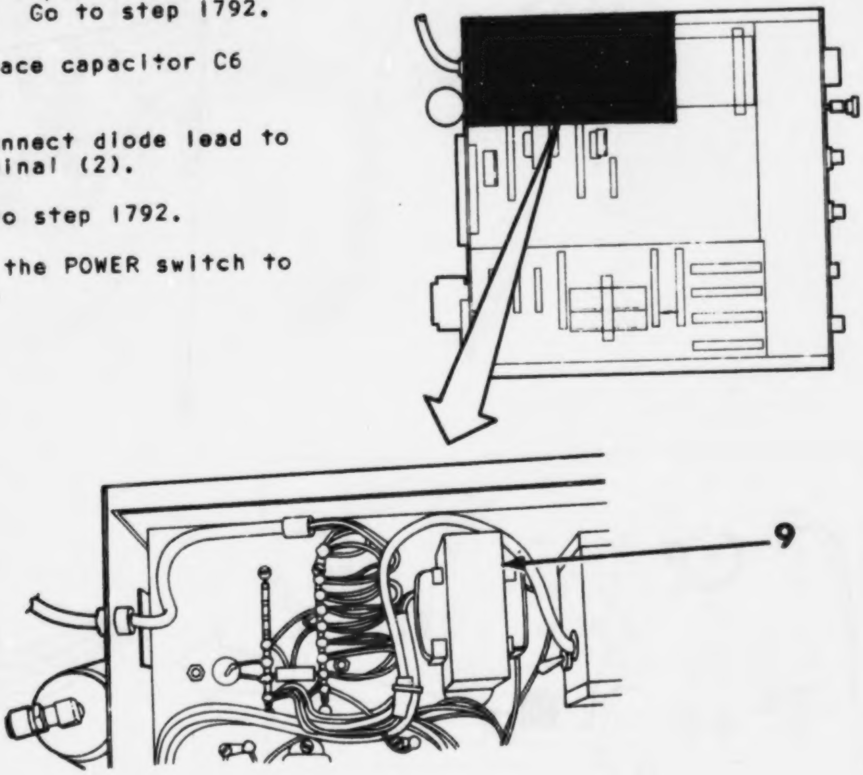
1814. Set the POWER switch to OFF.

1815. Disconnect AC power from monitor.

1816. Disconnect diode lead (4) from terminal.

1817. Use VOM to measure OHMS. Connect positive test lead to terminal (7), common test lead to diode lead (8).

1818. Check that VOM indicates 20 ohms or less. If not, replace diode CR2 (6). Go to



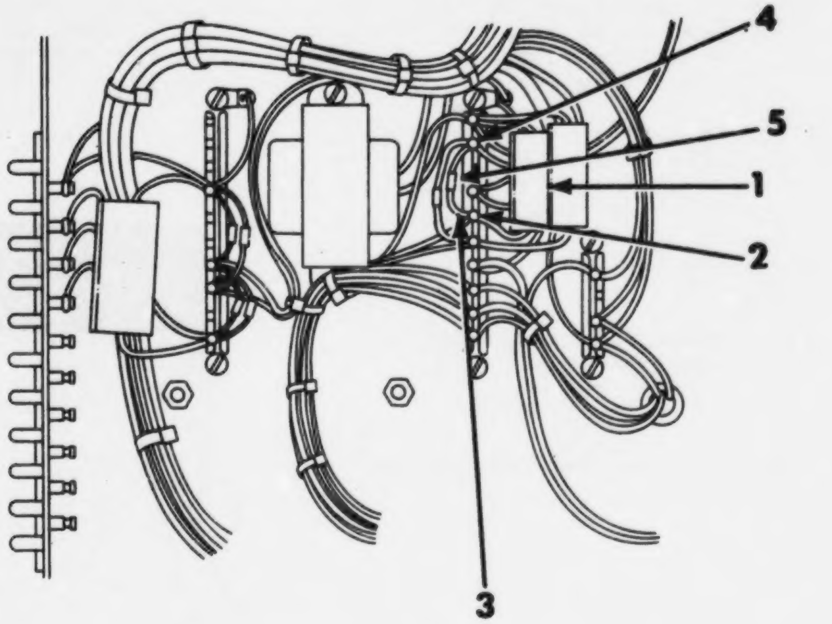
1819. Use VOM to measure OHMS. Connect positive test lead to diode lead (3), common test lead to terminal (4).

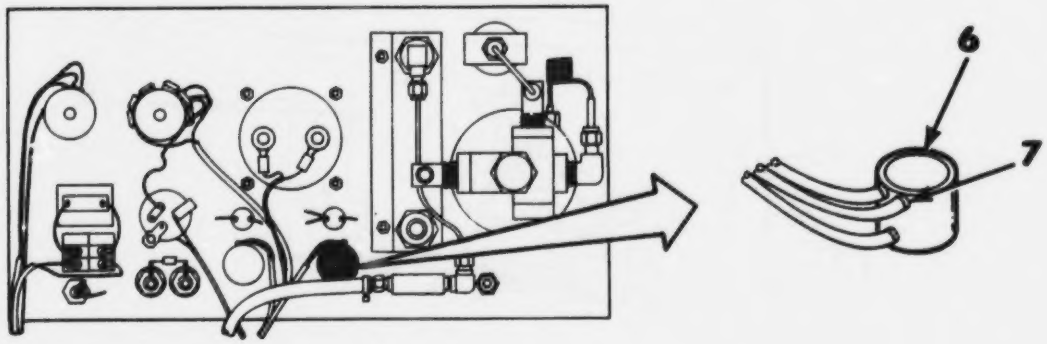
1820. Check that VOM indicates 100K ohms or more. If not, replace diode CR2 (5). Go to step 1823 .

1821. Replace capacitor C7 (1).

1822. Reconnect diode lead to terminal (2).

1823. Reinstall 110V Regulator P.C. Board.





1824. Reinstall cover.

1825. Go to step 1.

1826. Disconnect wire (7) from potentiometer.

1827. Use VOM to measure OHMS. Connect positive test lead to J3 pin 15 (9), common test lead to J3 pin 13 (8).

1828. Check that VOM indicates 35K ohms or more. If not, repair or replace wiring and connectors as necessary; go to step 1830.

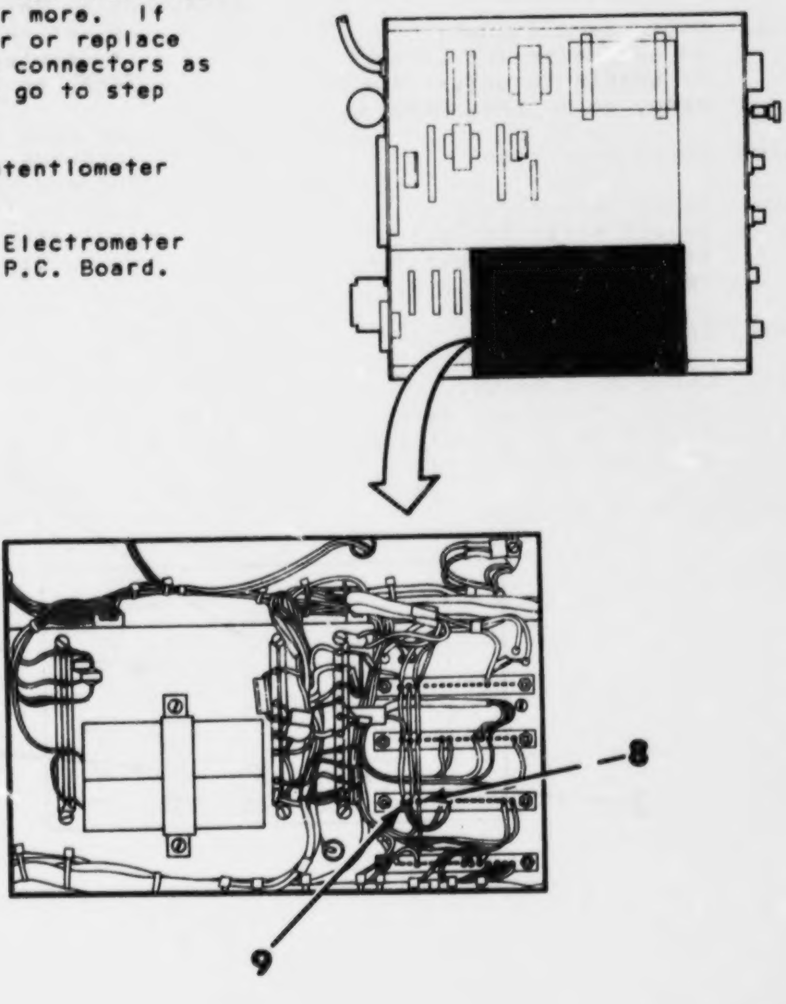
1829. Replace Potentiometer R17 (6).

1830. Reinstall Electrometer Amplifier P.C. Board.

1831. Reinstall 110V Regulator P.C. Board.

1832. Reinstall cover.

1833. Go to step 1.



1834. Set TIME CONSTANT SELECTOR (1) to 1 SEC.

1835. Check that O3 CONCENTRATION meter (3) indicates 0 within 3 seconds. If not, go to step 1837.

1836. Replace C4 (5). Go to step 1.

1837. Set TIME CONSTANT SELECTOR (1) to 10 SEC.

1838. Using Zero Adjust, adjust meter for zero. If unable to adjust for zero, go to step 2482.

1839. Go to step 1859.

1840. Using Zero Adjust, adjust meter for zero. If unable to adjust for zero, go to step 2482.

1841. Go to step 1857.

1842. Using Zero Adjust, adjust meter for zero. If unable to adjust for zero, go to step 2482.

1843. Go to step 1855.

1844. Using Zero Adjust, adjust meter for zero. If unable to adjust for zero, go to step 2482.

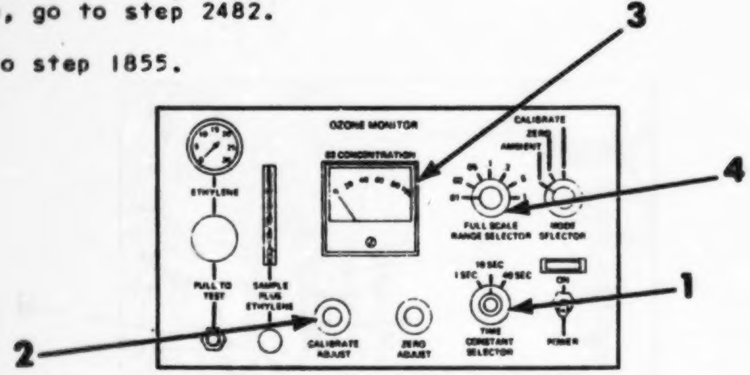
1845. Go to step 1853.

1846. Using Zero Adjust, adjust meter for zero. If unable to adjust for zero, go to step 2482.

1847. Go to step 1851.

1848. Using Zero Adjust, adjust meter for zero. If unable to adjust for zero, go to step 2482.

1849. Set FULL SCALE RANGE SELECTOR switch (4) to .02 and check that O3 CONCENTRATION meter (3) indicates zero. If not, go to step 2482.


3
4
1
2
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
TIME CONSTANT SELECTOR
POWER

1853. Set FULL SCALE RANGE SELECTOR switch (4) to .1 and check that 03 CONCENTRATION meter (3) indicates zero. If not, go to step 2482.

1855. Set FULL SCALE RANGE SELECTOR switch (4) to .2 and check that 03 CONCENTRATION meter (3) indicates zero. If not, go to step 2482.

1857. Set FULL SCALE RANGE SELECTOR switch (4) to .5 and check that 03 CONCENTRATION meter (3) indicates zero. If not, go to step 2482.

1859. Set FULL SCALE RANGE SELECTOR switch (4) to 1 and check that 03 CONCENTRATION meter (3) indicates zero. If not, go to step 2482.

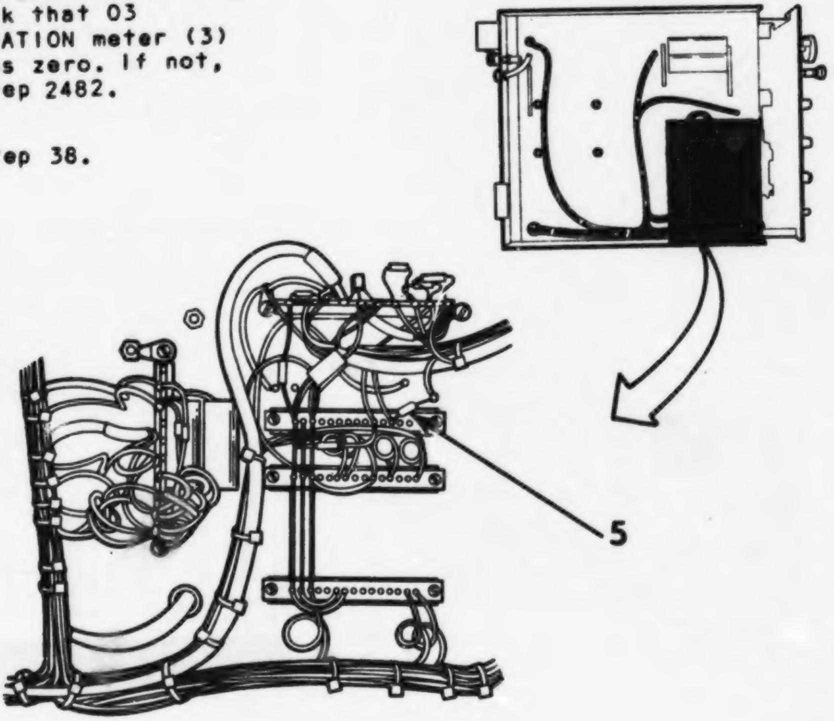
1860. Go to step 38.

1861. Set FULL SCALE RANGE SELECTOR switch (4) to .05 and check that 03 CONCENTRATION meter (3) indicates zero. If not, go to step 2482.

1862. Check that 03 CONCENTRATION meter (3) indicates between 12 and 20. If not, go to step 1867.

1863. Check that Calibration Adjust (2) will adjust 03 CONCENTRATION meter (3) indication to 16. If not, go to step 1867.

1864. Set FULL SCALE RANGE SELECTOR (4) to 1.



1865. Check that O3 CONCENTRATION meter (2) indicates between 7 and 9. If not, go to step 1867.

1866. Go to step 81.

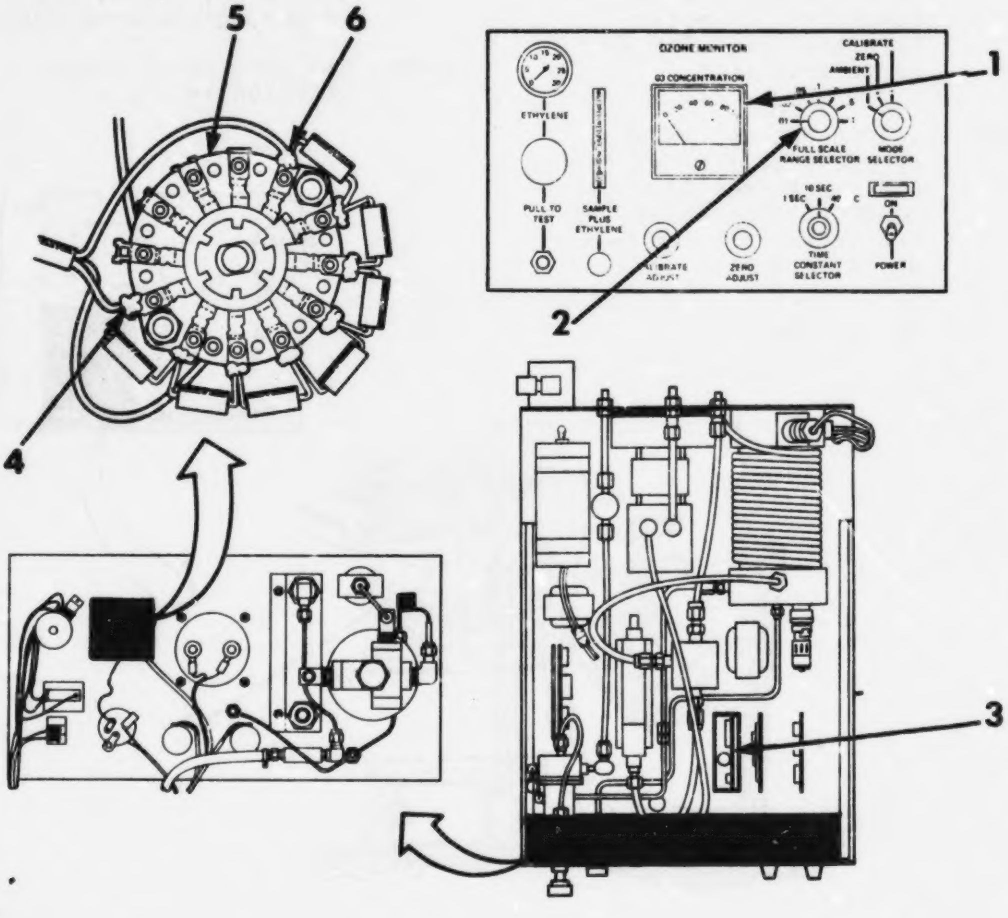
1867. Set the POWER switch to OFF.

1868. Interchange Electrometer Amplifier PC Board (3) with a new one.

1869. Set the POWER switch to ON.

1870. Set FULL SCALE RANGE SELECTOR (1) to .5.

1871. When O3 CONCENTRATION meter (2) indication stabilizes, check that meter indicates between 14 and 18. If not, go to step 1873.


5
6
1
OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE PLUS ETHYLENE
10 SEC
1 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
2
4
3

1872. Go to step 1.

1873. Set the POWER switch to OFF.

1874. Remove new Electrometer Amplifier PC Board (3) from monitor, reinstall old PC Board.

1875. Disconnect wire (6) from FULL SCALE RANGE SELECTOR switch.

1876. Disconnect wire (4) from FULL SCALE RANGE SELECTOR switch.

1877. Set FULL SCALE RANGE SELECTOR (1) to .5.

1878. Use VOM to measure OHMS. Connect positive test lead to S3 (6), common test lead to S3 (4).

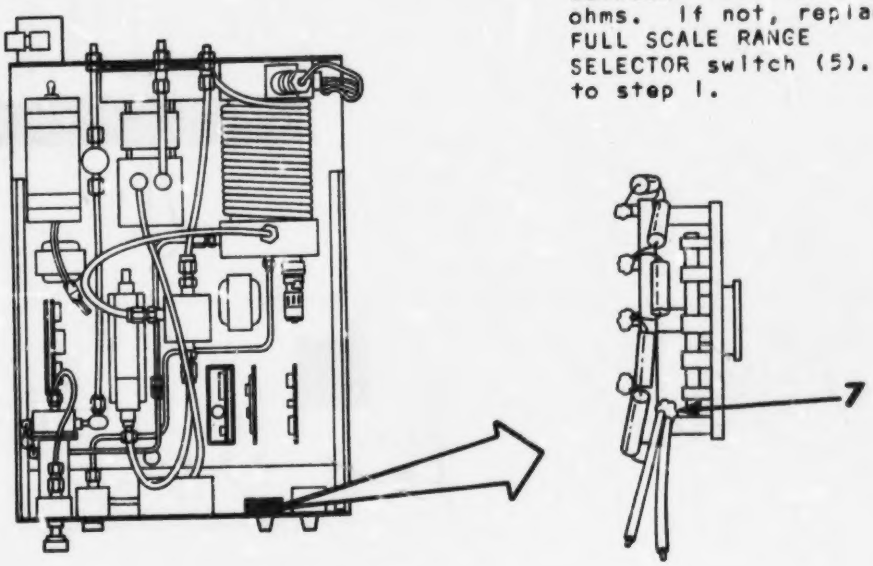
1879. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.

1880. Use VOM to measure OHMS. Connect positive test lead to S3 (7), common test lead to S3 (6).

1881. Check that VOM indicates between 47.5K and 52.5K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (5). Go to step 1.

1882. Use VOM to measure OHMS. Connect positive test lead to S3 (7), common test lead to S3 (4).

1883. Check that VOM indicates between 47.5K and 52.5K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (5). Go to step 1.



1884. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

1885. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

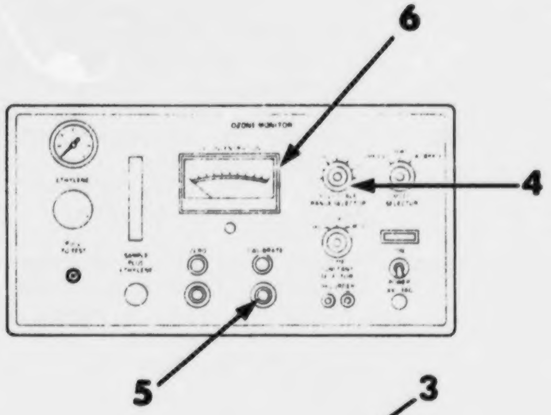
1886. Replace Detector Cell (1), refer to Replace Detector Cell Assembly; page 7-21.

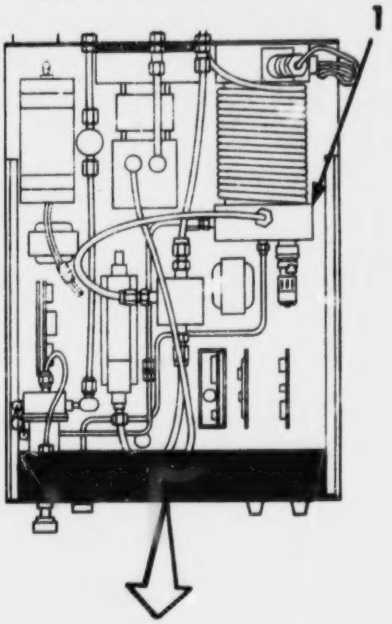
1887. Go to step 1.

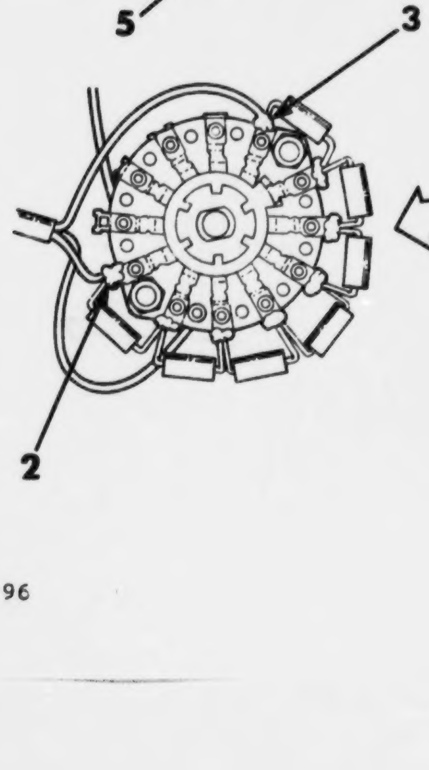
1888. Check that O3 CONCENTRATION meter (6) indicates between .12 and .2. If not, go to step 1893.

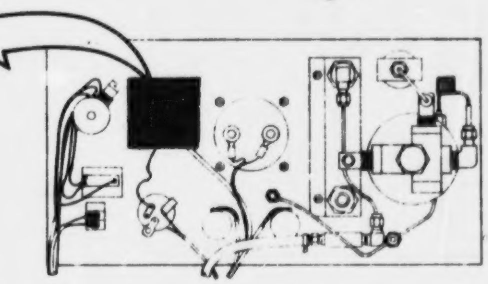
1889. Check that Calibration Adjust (5) will adjust O3 CONCENTRATION meter (6) indication to .16. If not, go to step 1893.

1890. Set FULL SCALE RANGE SELECTOR (4) to 1.









1891. Check that O3 CONCENTRATION meter (6) indicates between .07 and .09. If not, go to step 1893.

1892. Go to step 59.

1893. Set the POWER switch to OFF.

1894. Remove cover (7).

1895. Interchange Electrometer Amplifier PC Board (8) with a new one.

1896. Set the POWER switch to ON.

1897. Set FULL SCALE RANGE SELECTOR (4) to .5.

1898. When O3 CONCENTRATION meter (6) indication stabilizes, check that meter indicates between .14 and .18. If not, go to step 1901.

1899. Reinstall cover.

1900. Go to step 1.

1901. Set the POWER switch to OFF.

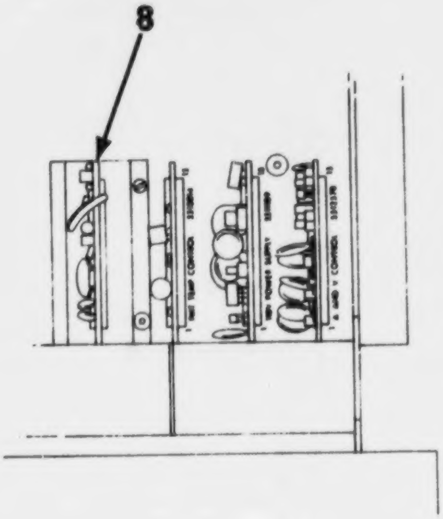
1902. Remove new Electrometer Amplifier PC Board (8) from monitor, reinstall old PC Board.

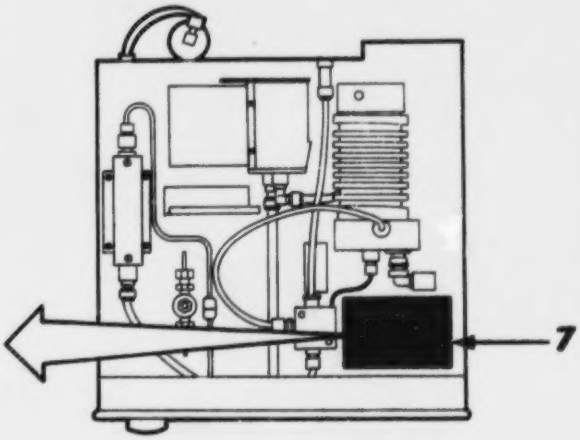
1903. Reinstall cover.

1904. Disconnect wire (3) from FULL SCALE RANGE SELECTOR switch.

1905. Disconnect wire (2) from FULL SCALE RANGE SELECTOR switch.

1906. Set FULL SCALE RANGE SELECTOR (4) to .5.





1907. Use VOM to measure OHMS. Connect positive test lead to S3 (3), common test lead to S3 (1).

1908. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.

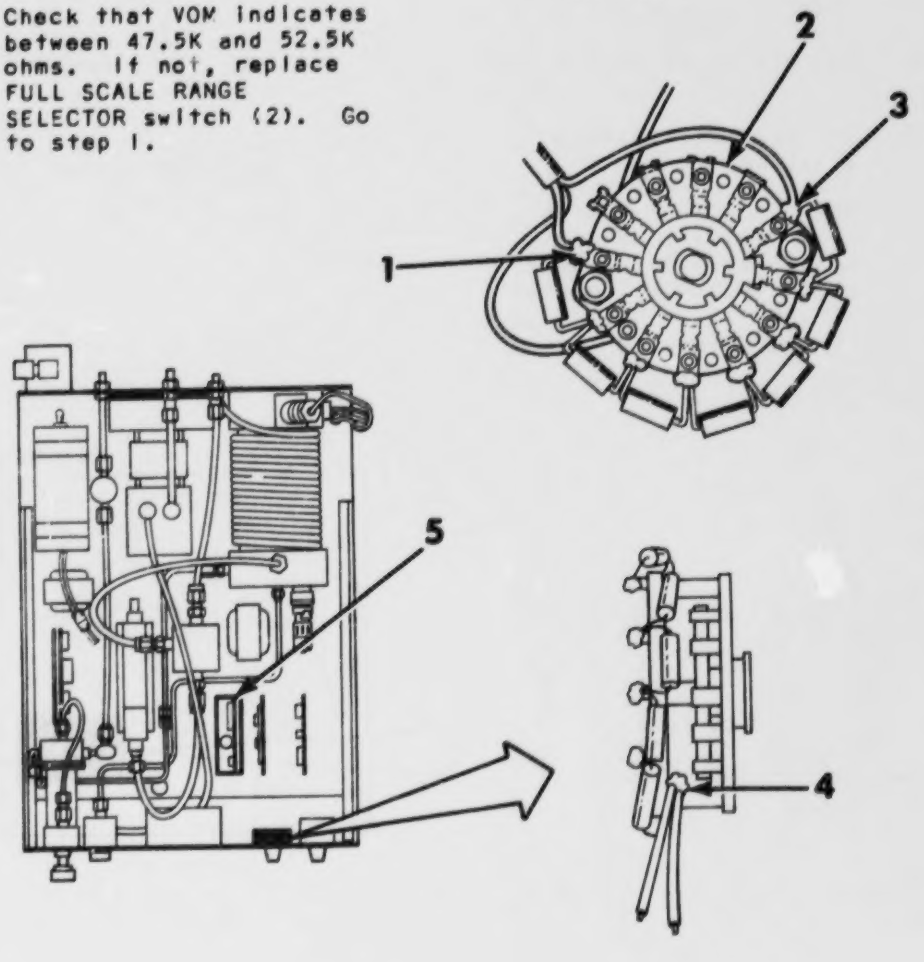
1909. Use VOM to measure OHMS. Connect positive test lead to S3 (4), common test lead to S3 (3).

1910. Check that VOM indicates between 47.5K and 52.5K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (2). Go to step 1.

1911. Use VOM to measure OHMS. Connect positive test lead to S3 (4), common test lead to S3 (1).

1912. Check that VOM indicates between 47.5K and 52.5K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (2). Go to step 1.

1913. Reconnect wire to FULL SCALE RANGE SELECTOR switch.



1914. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

1915. Replace Detector Cell (6), refer to Replace Detector Cell Assembly; page 7-21.

1916. Go to step 1.

1917. Check that O3 CONCENTRATION meter (8) indicates between 30 and 50. If not, go to step 1924.

1918. Check that Calibration Adjust (7) will adjust O3 CONCENTRATION meter (8) indication to 40. If not, go to step 1924.

1919. Set FULL SCALE RANGE SELECTOR (9) to .5.

1920. Check that O3 CONCENTRATION meter (8) indicates between 14 and 18. If not, go to step 1924.

1921. Set FULL SCALE RANGE SELECTOR (9) to 1.

1922. Check that O3 CONCENTRATION meter (8) indicates between 7 and 9. If not, go to step 1924.

1923. Go to step 81.

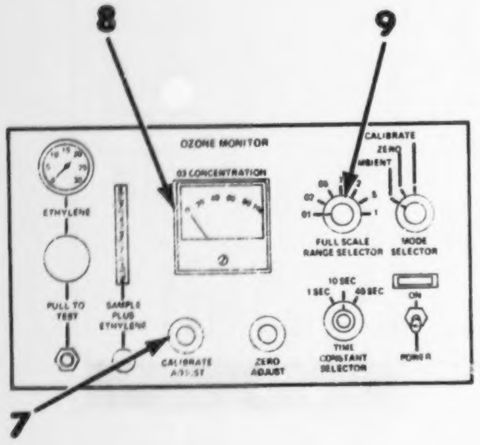
1924. Set the POWER switch to OFF.

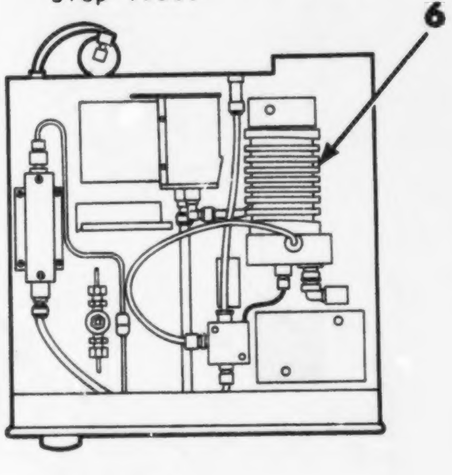
1925. Interchange Electrometer Amplifier PC Board (5) with a new one.

1926. Set the POWER switch to ON.

1927. Set FULL SCALE RANGE SELECTOR (9) to .2.

1928. When O3 CONCENTRATION meter (8) indication stabilizes, check that meter indicates between 35 and 45. If not, go to step 1930.


8
9
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE
ZERO
AMBIENT
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
7



1929. Go to step 1.

1930. Set the POWER switch to OFF.

1931. Remove new Electrometer Amplifier PC Board (9) from monitor, reinstall old PC Board.

1932. Disconnect wire (3) from FULL SCALE RANGE SELECTOR switch.

1933. Disconnect wire (1) from FULL SCALE RANGE SELECTOR switch.

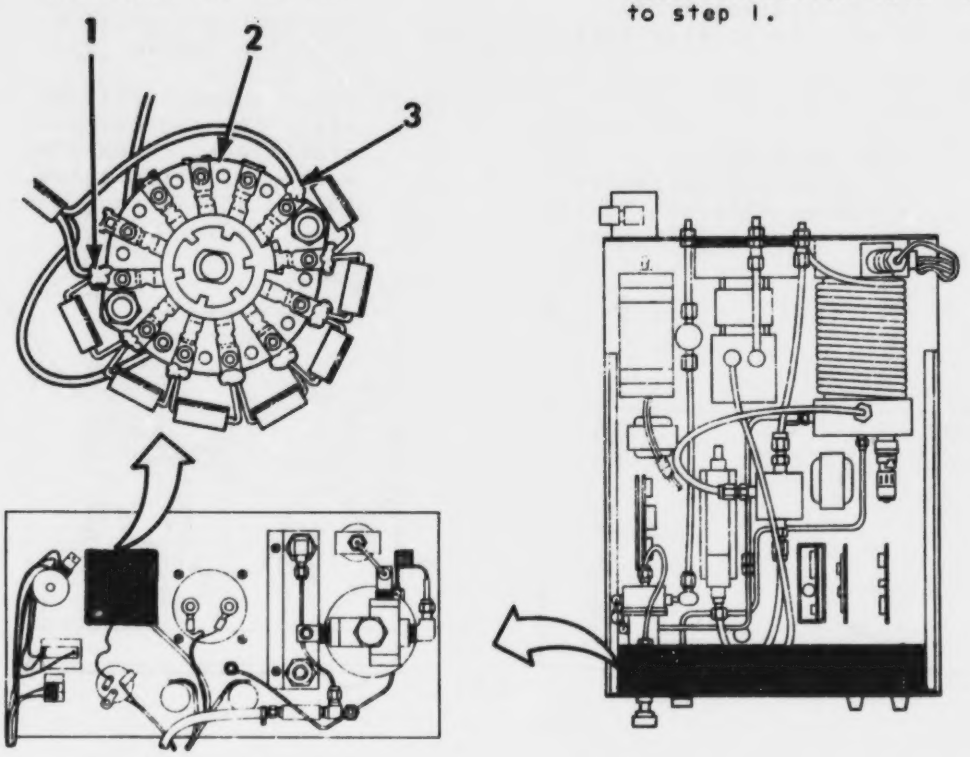
1934. Set FULL SCALE RANGE SELECTOR (4) to .2.

1935. Use VOM to measure OHMS. Connect positive test lead to S3 (3), common test lead to S3 (1).

1936. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.

1937. Use VOM to measure OHMS. Connect positive test lead to S3 (7), common test lead to S3 (3).

1938. Check that VOM indicates between 75K and 85K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (2). Go to step 1.



1939. Use VOM to measure OHMS. Connect positive test lead to S3 (7), common test lead to S3 (1).

1940. Check that VOM indicates between 19K and 21K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (2). Go to step 1.

1941. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

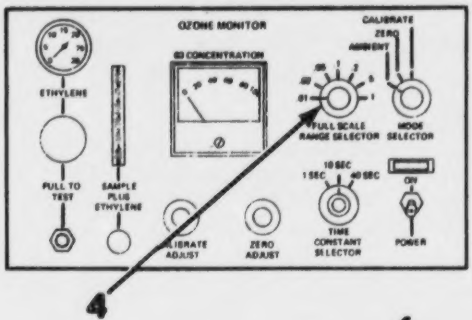
1942. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

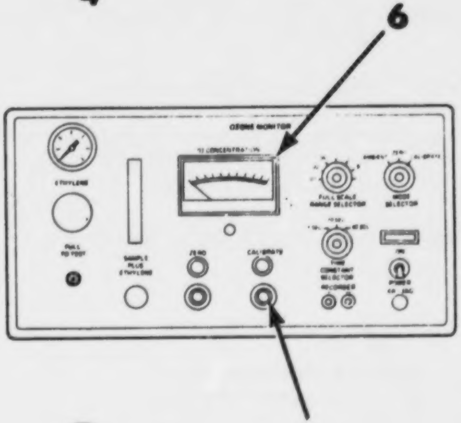
1943. Replace Detector Cell (8), refer to Replace Detector Cell Assembly; page 7-21.

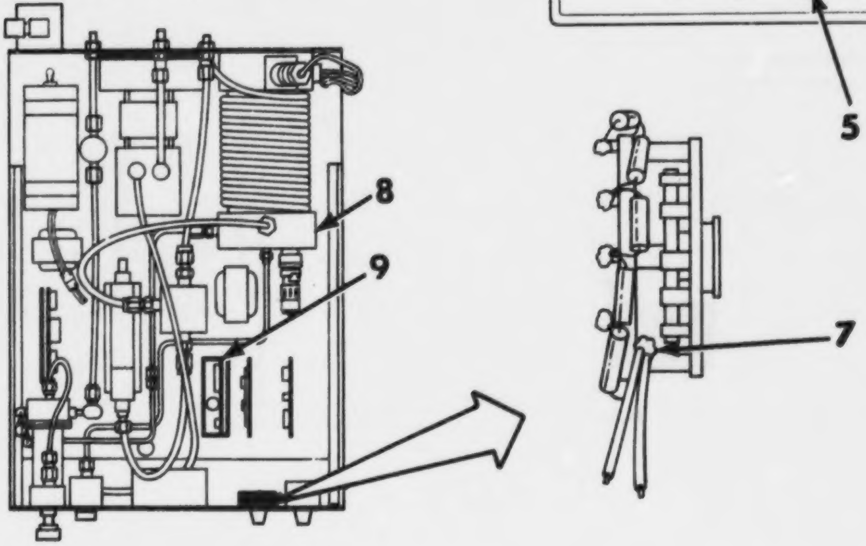
1944. Go to step 1.

1945. Check that O3 CONCENTRATION meter (6) indicates between .30 and .50. If not, go to step 1952.

1946. Check that Calibration Adjust (5) will adjust O3 CONCENTRATION meter (6) indication to .40. If not, go to step 1952.


OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
4


6
OZONE MONITOR
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
ZERO
CALIBRATE
5



1947. Set FULL SCALE RANGE SELECTOR (2) to .5.

1948. Check that O3 CONCENTRATION meter (1) indicates between .14 and .18. If not, go to step 1952.

1949. Set FULL SCALE RANGE SELECTOR (2) to 1.

1950. Check that O3 CONCENTRATION meter (1) indicates between .07 and .09. If not, go to step 1952.

1951. Go to step 59.

1952. Set the POWER switch to OFF.

1953. Remove cover (4).

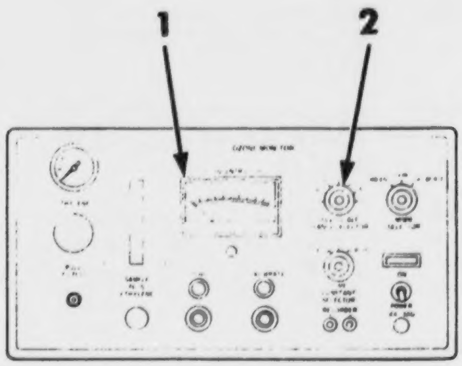
1954. Interchange Electrometer Amplifier PC Board (3) with a new one.

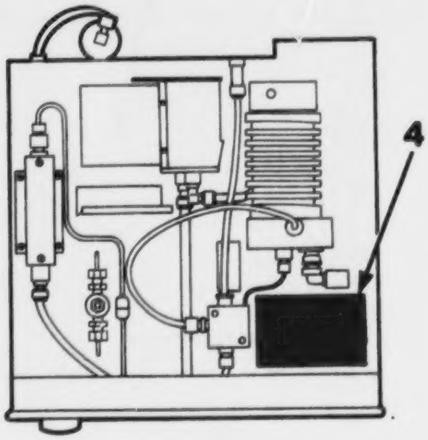
1955. Set the POWER switch to ON.

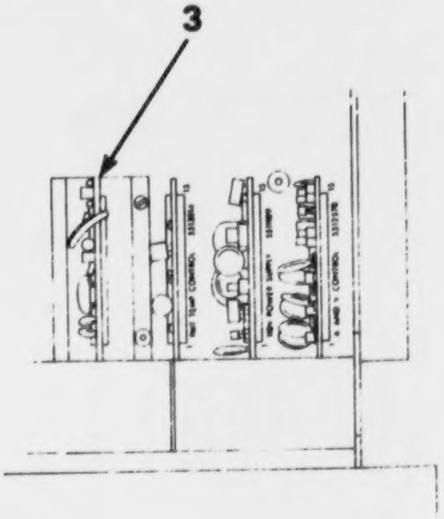
1956. Set FULL SCALE RANGE SELECTOR (2) to .2.

1957. When O3 CONCENTRATION meter (1) indication stabilizes, check that meter indicates between .35 and .45. If not, go to step 1960.

1958. Reinstall cover.







1959. Go to step 1.

1960. Set the POWER switch to OFF.

1961. Remove new Electrometer Amplifier PC Board (3) from monitor, reinstall old PC Board.

1962. Reinstall cover.

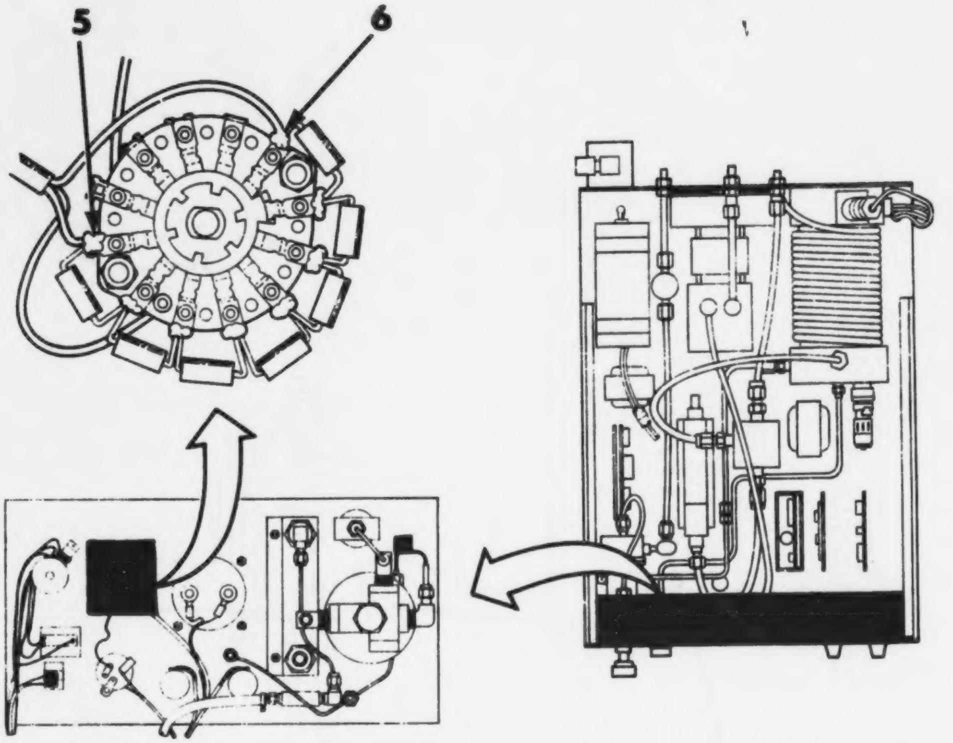
1963. Disconnect wire (6) from FULL SCALE RANGE SELECTOR switch.

1964. Disconnect wire (5) from FULL SCALE RANGE SELECTOR switch.

1965. Set FULL SCALE RANGE SELECTOR (2) to .2.

1966. Use VOM to measure OHMS. Connect positive test lead to S3 (6), common test lead to S3 (5).

1967. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.



1968. Use VOM to measure OHMS. Connect positive test lead to S3 (4), common test lead to S3 (3).

1969. Check that VOM indicates between 75K and 85K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (2). Go to step 1.

1970. Use VOM to measure OHMS. Connect positive test lead to S3 (4), common test lead to S3 (1).

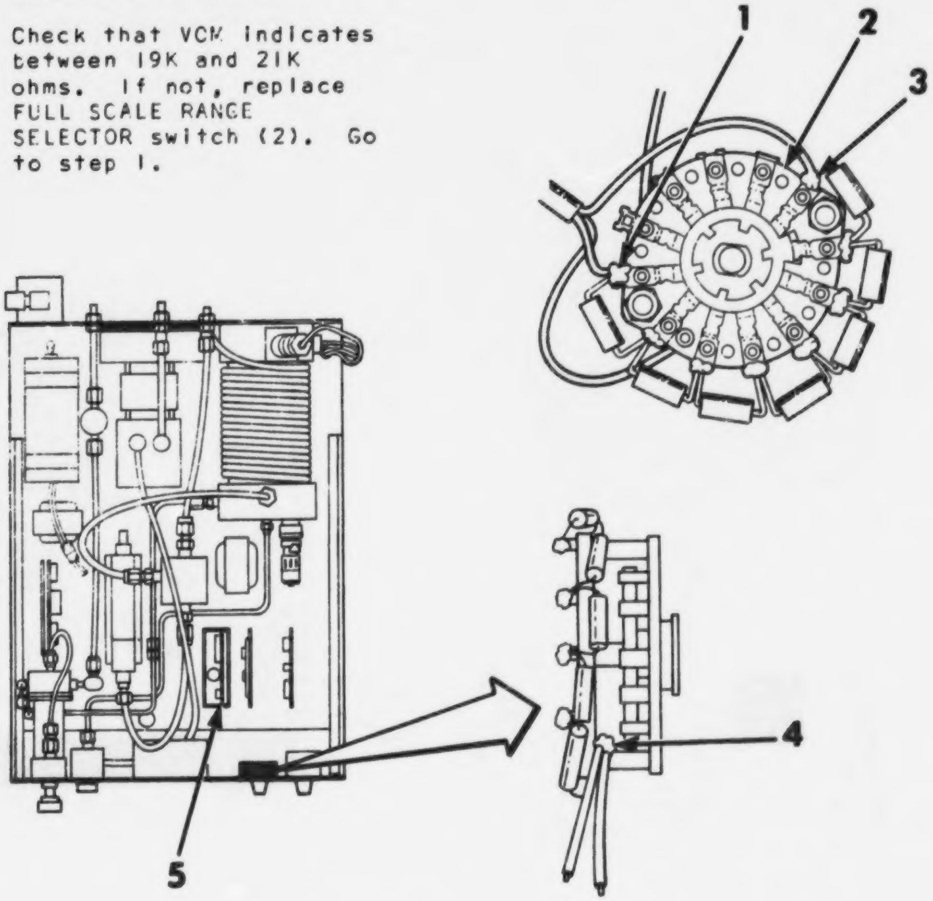
1971. Check that VOM indicates between 19K and 21K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (2). Go to step 1.

1972. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

1973. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

1974. Replace Detector Cell (6), refer to Replace Detector Cell Assembly; page 7-21.

1975. Go to step 1.



1976. Check that O3 CONCENTRATION meter (8) indicates between 65 and 95. If not, go to step 1985.

1977. Check that Calibration Adjust (7) will adjust O3 CONCENTRATION meter (8) indication to 80. If not, go to step 1985.

1978. Set FULL SCALE RANGE SELECTOR (9) to .2.

1979. Check that O3 CONCENTRATION meter (8) indicates between 35 and 45. If not, go to step 1985.

1980. Set FULL SCALE RANGE SELECTOR (9) to .5.

1981. Check that O3 CONCENTRATION meter (8) indicates between 14 and 18. If not, go to step 1985.

1982. Set FULL SCALE RANGE SELECTOR (9) to 1.

1983. Check that O3 CONCENTRATION meter (8) indicates between 7 and 9. If not, go to step 1985.

1984. Go to step 81.

1985. Set the POWER switch to OFF.

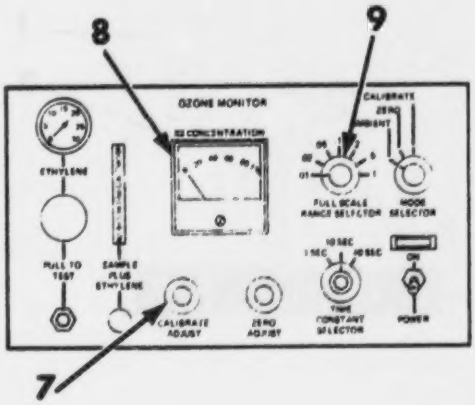
1986. Interchange Electrometer Amplifier PC Board (5) with a new one.

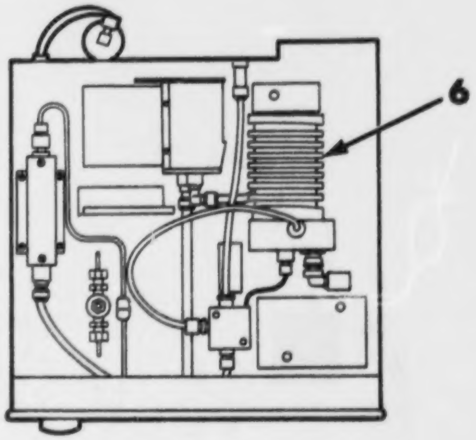
1987. Set the POWER switch to ON.

1988. Set FULL SCALE RANGE SELECTOR (9) to .1.

1989. When O3 CONCENTRATION meter (8) indication stabilizes, check that meter indicates between 70 and 90. If not, go to step 1991.

1990. Go to step 1.


8
9
OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
100 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
7



1991. Set the POWER switch to OFF.

1992. Remove new Electrometer Amplifier PC Board (2) from monitor, reinstall old PC Board.

1993. Disconnect wire (5) from FULL SCALE RANGE SELECTOR switch.

1994. Disconnect wire (3) from FULL SCALE RANGE SELECTOR switch.

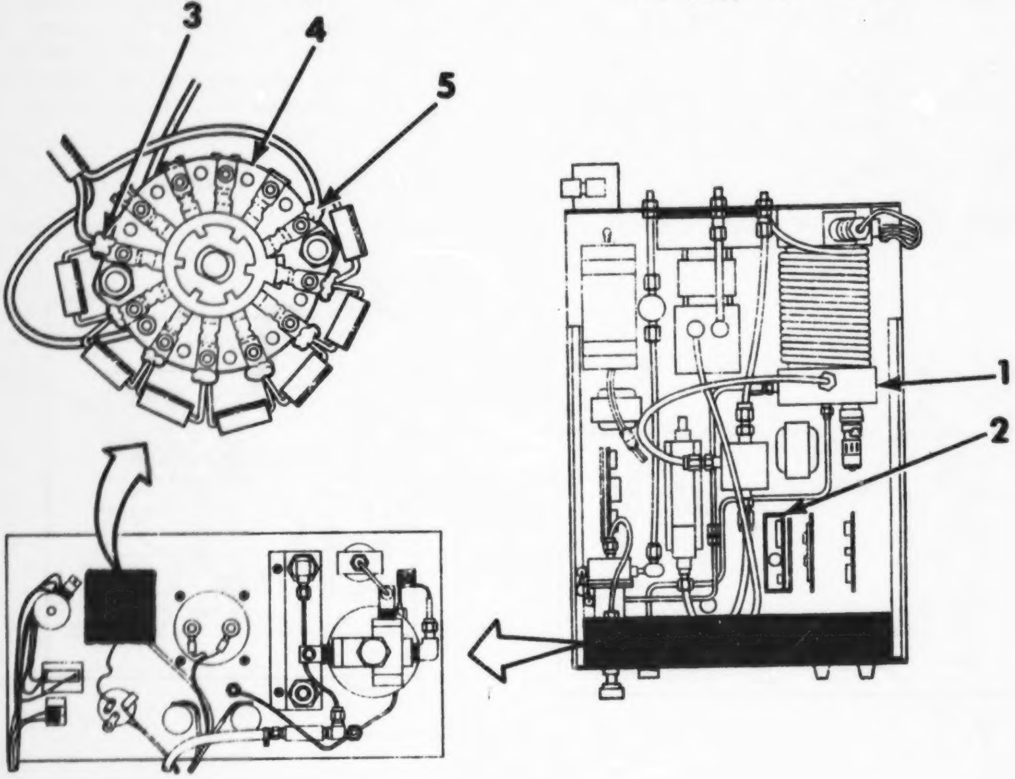
1995. Set FULL SCALE RANGE SELECTOR (7) to .1.

1996. Use VOM to measure OHMS. Connect positive test lead to S3 (5), common test lead to S3 (3).

1997. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.

1998. Use VOM to measure OHMS. Connect positive test lead to S3 (8), common test lead to S3 (5).

1999. Check that VOM indicates between 85K and 95K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (4). Go to step 1.



2000. Use VOM to measure OHMS. Connect positive test lead to S3 (8), common test lead to S3 (3).

2001. Check that VOM indicates between 9.5K and 10.5K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (4). Go to step 1.

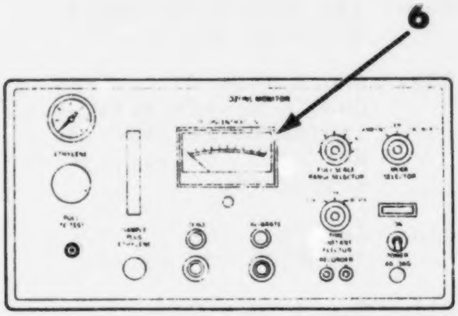
2002. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

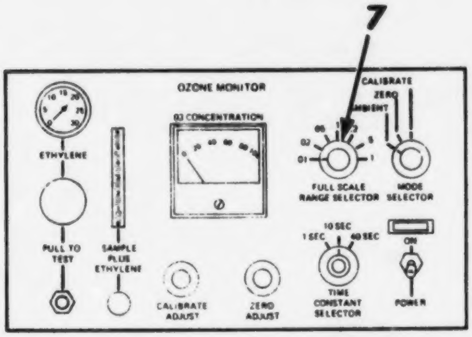
2003. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

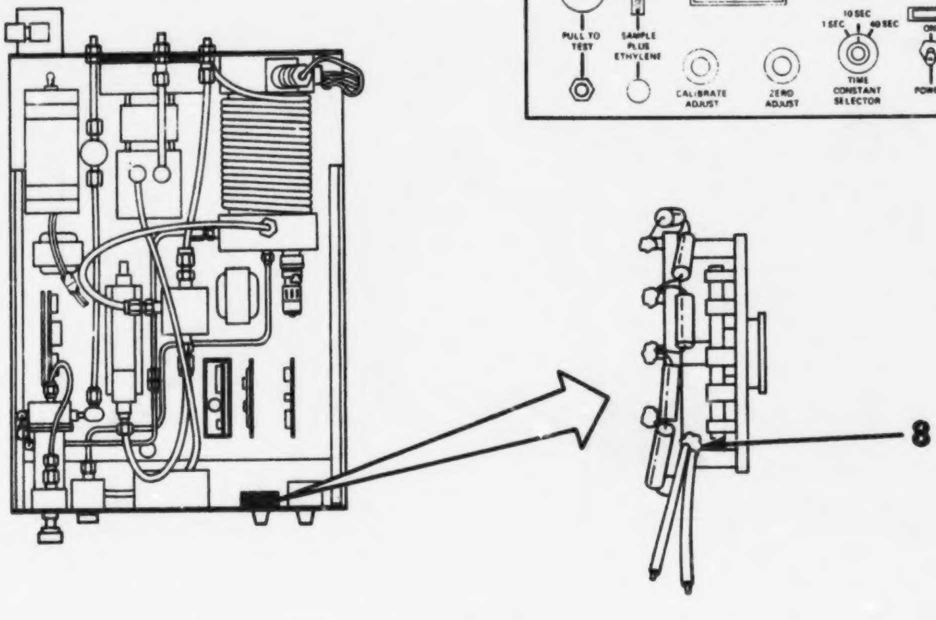
2004. Replace Detector Cell (1), refer to Replace Detector Cell Assembly; page 7-21.

2005. Go to step 1.

2006. Check that O3 CONCENTRATION meter (6) indicates between .65 and .95. If not, go to step 2015.


6
OZONE MONITOR
ETHYLENE


7
OZONE MONITOR
CALIBRATE
ZERO
AMBIENT
ETHYLENE
O3 CONCENTRATION
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE PLUS ETHYLENE
1 SEC
10 SEC
60 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER



2007. Check that Calibration Adjust (1) will adjust O3 CONCENTRATION meter (2) indication to .8. If not, go to step 2015.

2008. Set FULL SCALE RANGE SELECTOR (3) to .2.

2009. Check that O3 CONCENTRATION meter (2) indicates between .35 and .45. If not, go to step 2015.

2010. Set FULL SCALE RANGE SELECTOR (3) to .5.

2011. Check that O3 CONCENTRATION meter (2) indicates between .14 and .18. If not, go to step 2015.

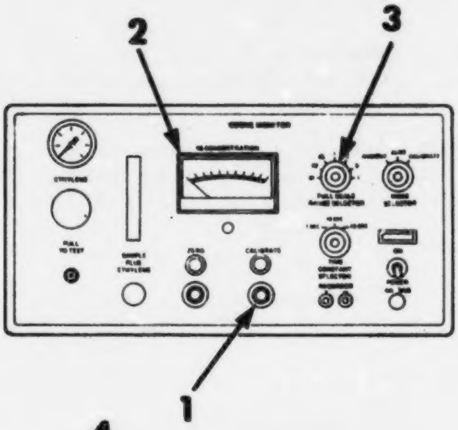
2012. Set FULL SCALE RANGE SELECTOR (3) to 1.

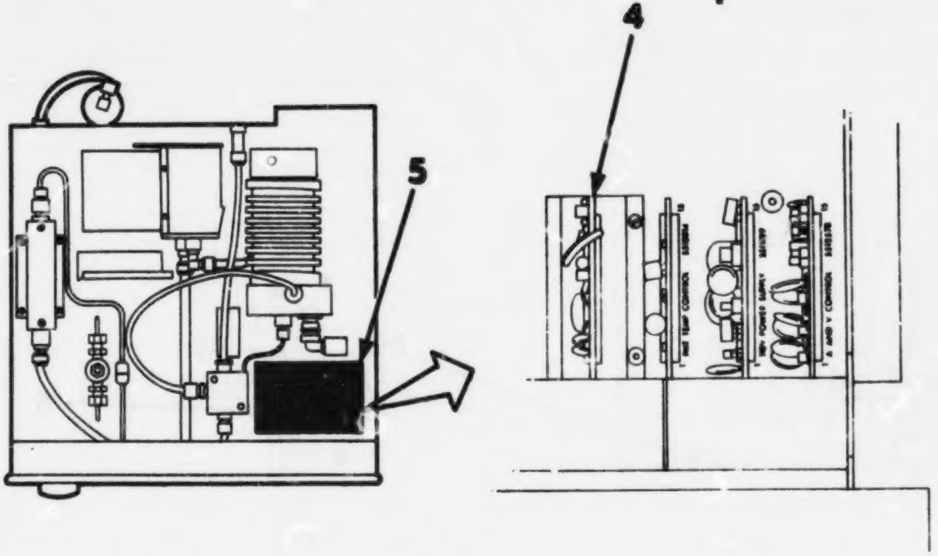
2013. Check that O3 CONCENTRATION meter (2) indicates between .07 and .09. If not, go to step 2015.

2014. Go to step 59.

2015. Set the POWER switch to OFF.

2016. Remove cover (5).





2017. Interchange Electrometer Amplifier PC Board (4) with a new one.

2018. Set the POWER switch to ON.

2019. Set FULL SCALE RANGE SELECTOR (3) to .1.

2020. When O3 CONCENTRATION meter (2) indication stabilizes, check that meter indicates between .70 and .90. If not, go to step 2023.

2021. Reinstall cover.

2022. Go to step 1.

2023. Set the POWER switch to OFF.

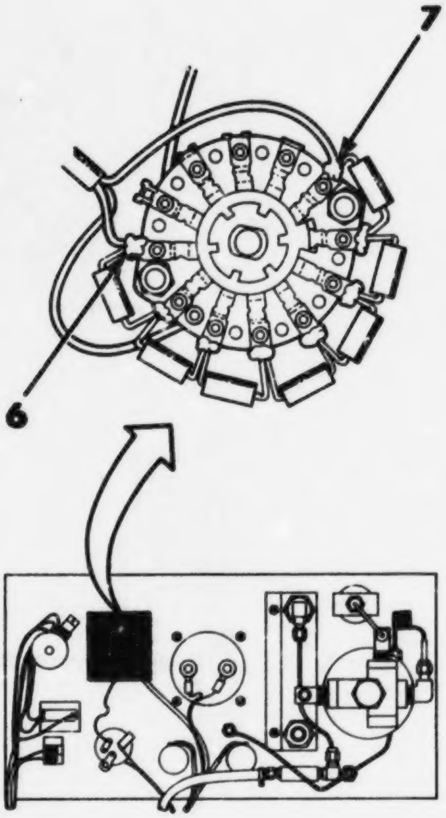
2024. Remove new Electrometer Amplifier PC Board (4) from monitor, reinstall old PC Board.

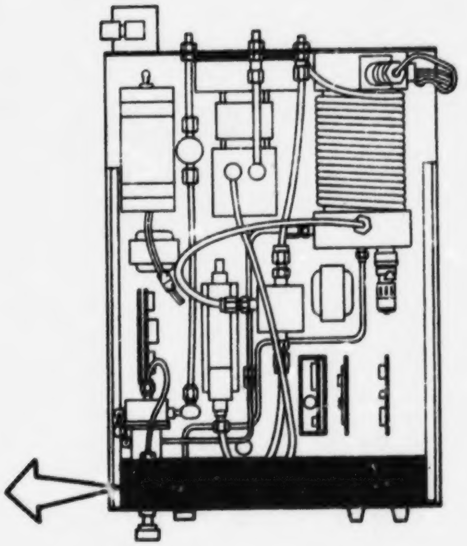
2025. Reinstall cover.

2026. Disconnect wire (7) from FULL SCALE RANGE SELECTOR switch.

2027. Disconnect wire (6) from FULL SCALE RANGE SELECTOR switch.

2028. Set FULL SCALE RANGE SELECTOR (3) to .1.





2029. Use VOM to measure OHMS. Connect positive test lead to S3 (3), common test lead to S3 (1).

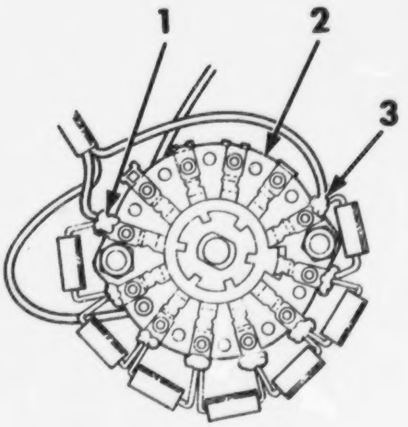
2030. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.

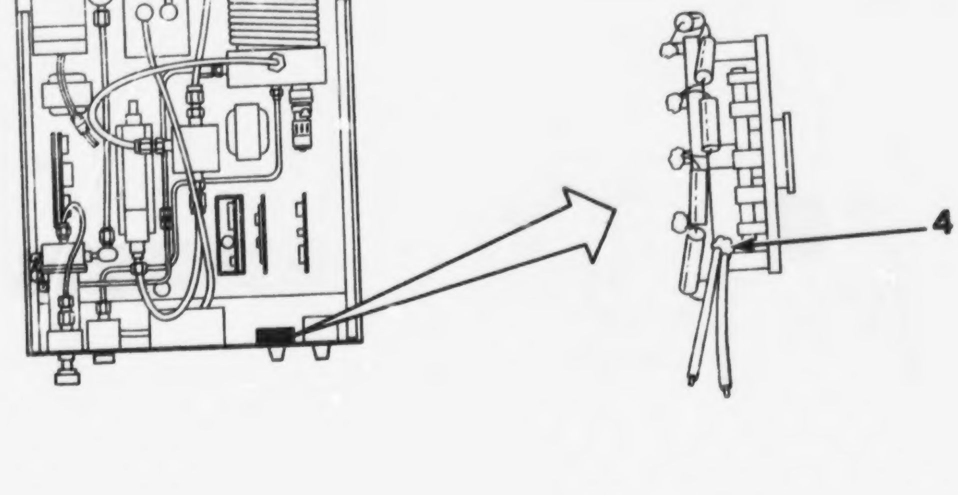
2031. Use VOM to measure OHMS. Connect positive test lead to S3 (4), common test lead to S3 (3).

2032. Check that VOM indicates between 85K and 95K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (2). Go to step 1.

2033. Use VOM to measure OHMS. Connect positive test lead to S3 (4), common test lead to S3 (1).

2034. Check that VOM indicates between 9.5K and 10.5K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (2). Go to step 1.





2035. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

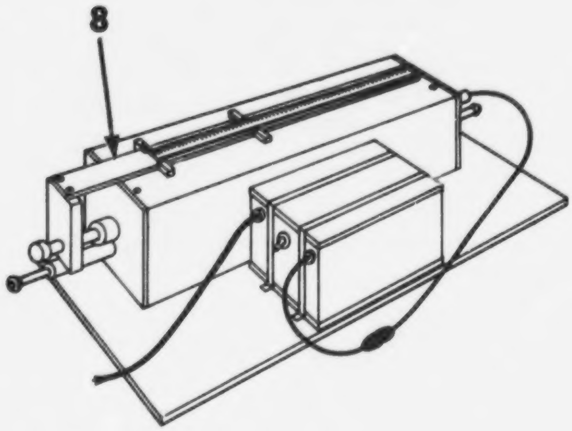
2036. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2037. Replace Detector Cell (5), refer to Replace Detector Cell Assembly; page 7-21 .

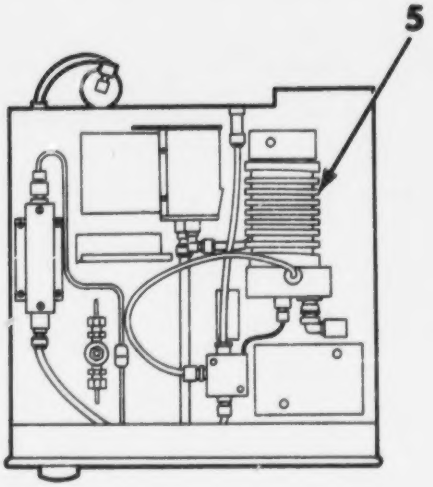
2038. Go to step 1.

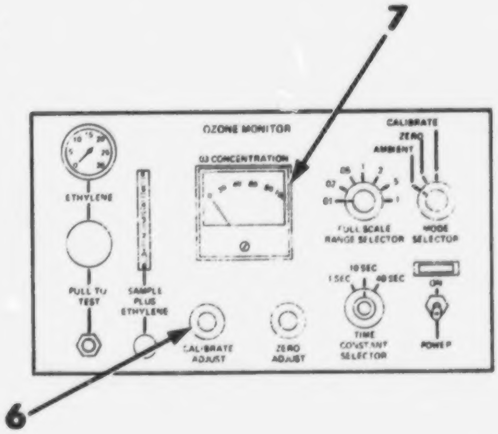
2039. Check that 03 CONCENTRATION meter (7) indicates between 12 and 20. If not, go to step 2052.

2040. Check that Calibration Adjust (6) will adjust 03 CONCENTRATION meter (7) indication to 16. If not, go to step 2052.



2041. Using EXTERNAL 03 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM 03 concentration. Set generator sleeve (8) to this setting.




7
OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
6

2042. Set FULL SCALE RANGE SELECTOR (2) to .1.

2043. Check that O3 CONCENTRATION meter (1) indicates between 79 and 90. If not, go to step 2051.

2044. Set FULL SCALE RANGE SELECTOR (2) to .2.

2045. Check that O3 CONCENTRATION meter (1) indicates between 35 and 45. If not, go to step 2051.

2046. Set FULL SCALE RANGE SELECTOR (2) to .5.

2047. Check that O3 CONCENTRATION meter (1) indicates between 14 and 18. If not, go to step 2051.

2048. Set FULL SCALE RANGE SELECTOR (2) to 1.

2049. Check that O3 CONCENTRATION meter (1) indicates between 7 and 9. If not, go to step 2051.

2050. Go to step 81.

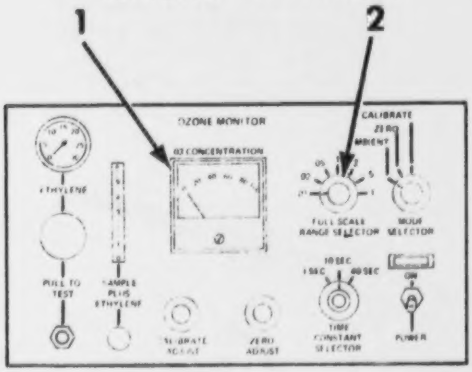
2051. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (3) to this setting.

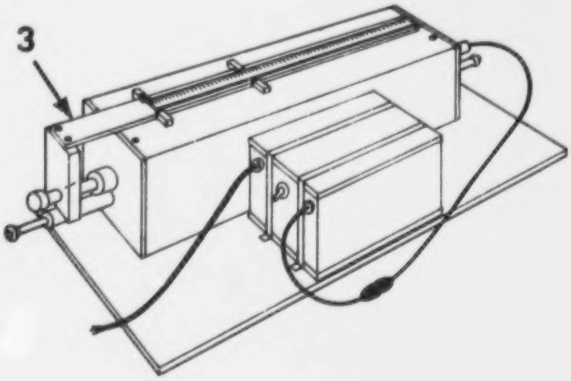
2052. Set the POWER switch to OFF.

2053. Interchange Electrometer Amlifier PC Board (6) with a new one.

2054. Set the POWER switch to ON.

2055. Set FULL SCALE RANGE SELECTOR (2) to .05.


1
2
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER



2056. When O3 CONCENTRATION meter (1) indication stabilizes, check that meter indicates between 14 and 18. If not, go to step 2058.

2057. Go to step 1.

2058. Set the POWER switch to OFF.

2059. Remove new Electrometer Amplifier PC Board (6) from monitor, reinstall old PC Board.

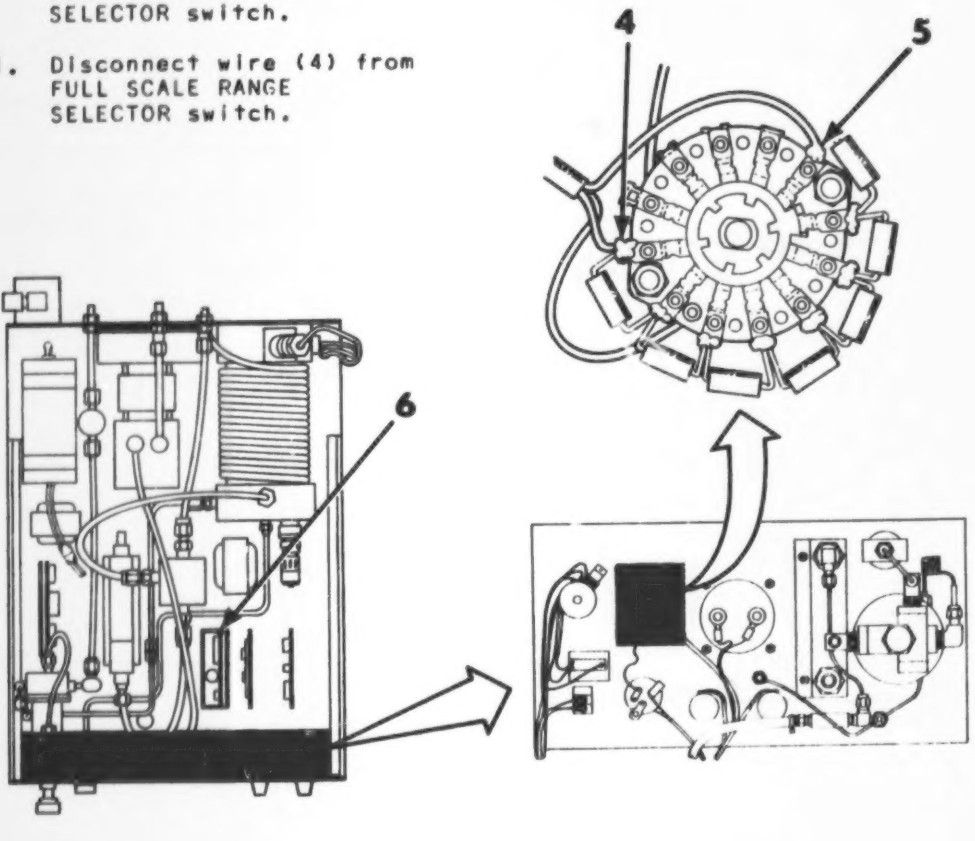
2060. Disconnect wire (5) from FULL SCALE RANGE SELECTOR switch.

2061. Disconnect wire (4) from FULL SCALE RANGE SELECTOR switch.

2062. Set FULL SCALE RANGE SELECTOR (2) to .05.

2063. Use VOM to measure OHMS. Connect positive test lead to S3 (5), common test lead to S3 (4).

2064. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.



2065. Use VOM to measure OHMS. Connect positive test lead to S3 (1), common test lead to S3 (5).

2066. Check that VOM indicates between 90K and 100K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (4). Go to step 1.

2067. Use VOM to measure OHMS. Connect positive test lead to S3 (1), common test lead to S3 (3).

2068. Check that VOM indicates between 4.75K and 5.25K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (4). Go to step 1.

2069. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2070. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

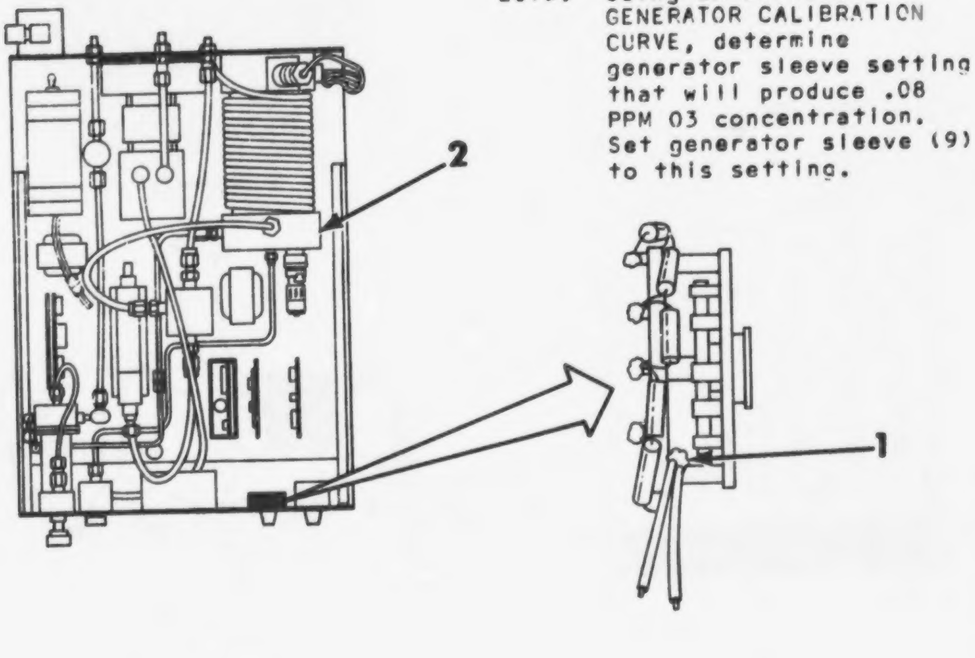
2071. Replace Detector Cell (2), refer to Replace Detector Cell Assembly; page 7-21.

2072. Go to step 1.

2073. Check that O3 CONCENTRATION meter (7) indicates between .12 and .20. If not, go to step 2086.

2074. Check that Calibration Adjust (6) will adjust O3 CONCENTRATION meter (7) indication to .16. If not, go to step 2086.

2075. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (9) to this setting.



2076. Set FULL SCALE RANGE SELECTOR (8) to .1.

2077. Check that O3 CONCENTRATION meter (7) indicates between .70 and .90. If not, go to step 2085.

2078. Set FULL SCALE RANGE SELECTOR (8) to .2.

2079. Check that O3 CONCENTRATION meter (7) indicates between .35 and .45. If not, go to step 2085.

2080. Set FULL SCALE RANGE SELECTOR (8) to .5.

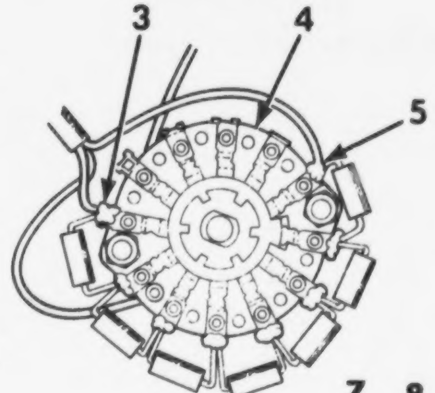
2081. Check that O3 CONCENTRATION meter (7) indicates between .14 and .18. If not, go to step 2085.

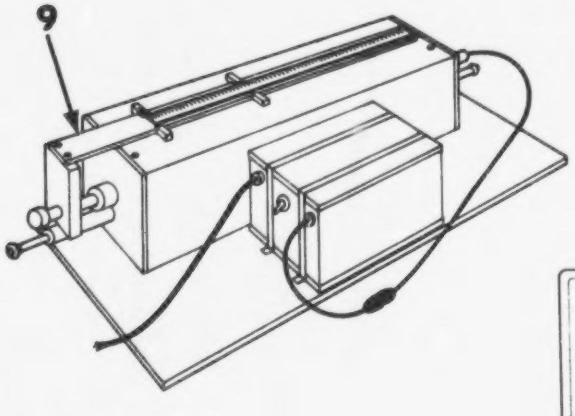
2082. Set FULL SCALE RANGE SELECTOR (8) to 1.

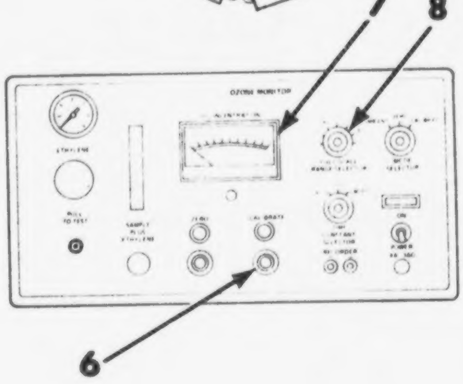
2083. Check that O3 CONCENTRATION meter (7) indicates between .07 and .09. If not, go to step 2085.

2084. Go to step 59.

2085. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (9) to this setting.







2086. Set the POWER switch to OFF.

2087. Remove cover (1).

2088. Interchange Electrometer Amplifier PC Board (2) with a new one.

2089. Set the POWER switch to ON.

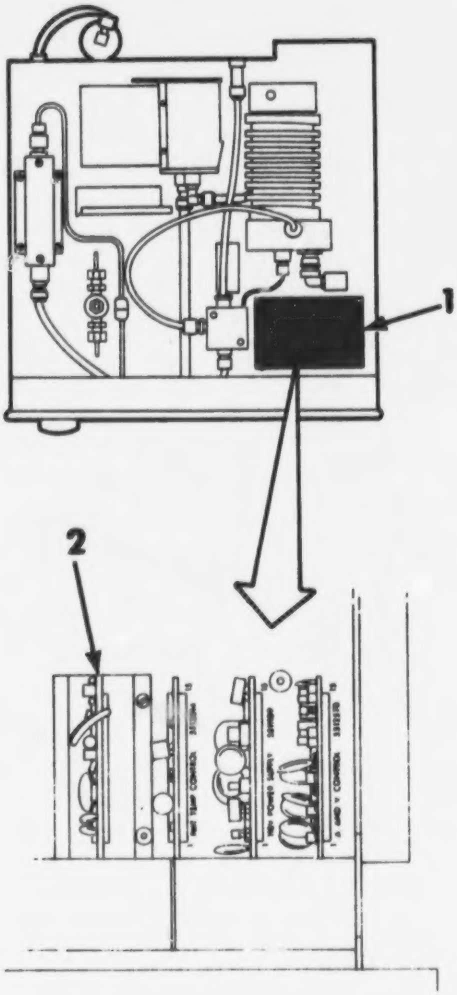
2090. Set FULL SCALE RANGE SELECTOR (4) to .05.

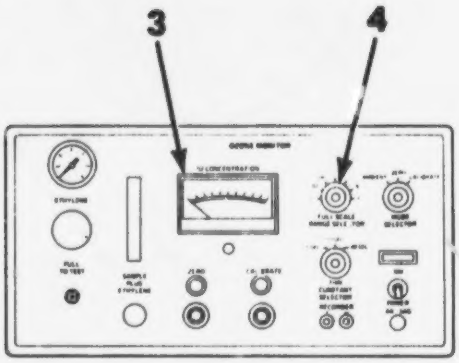
2091. When O3 CONCENTRATION meter (3) indication stabilizes, check that meter indicates between .14 and .18. If not, go to step 2094.

2092. Reinstall cover.

2093. Go to step 1.

2094. Set the POWER switch to OFF.





2095. Remove new Electrometer Amplifier PC Board (2) from monitor, reinstall old PC Board.

2096. Reinstall cover.

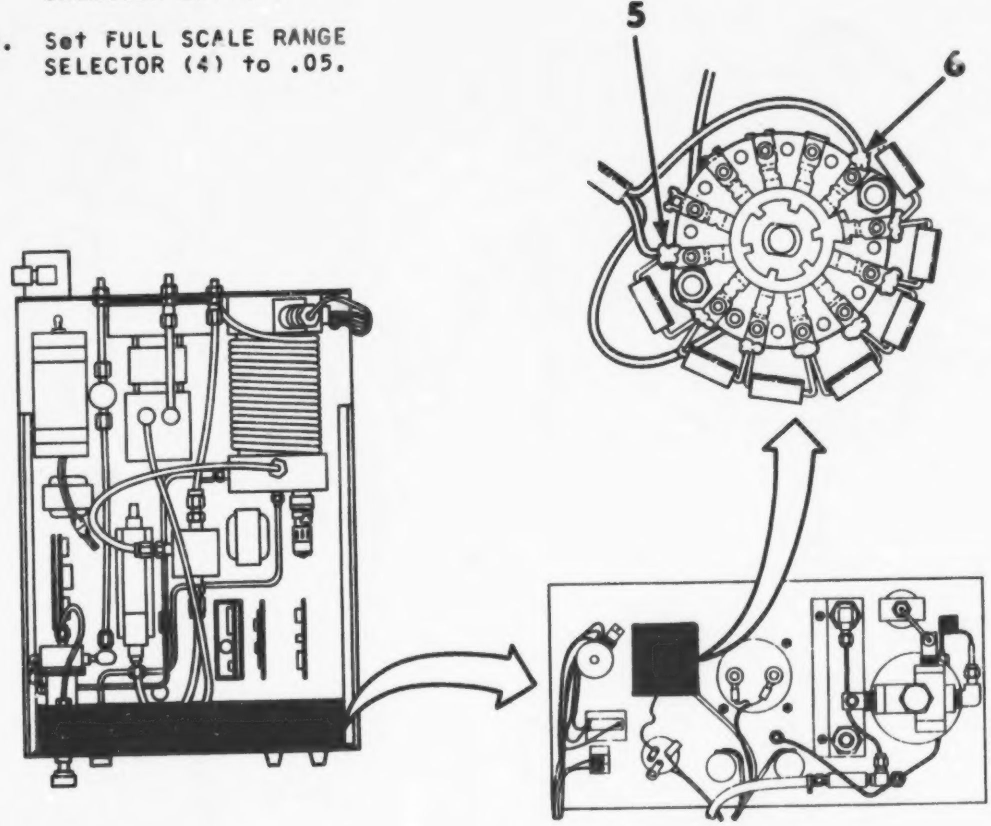
2097. Disconnect wire (6) from FULL SCALE RANGE SELECTOR switch.

2098. Disconnect wire (5) from FULL SCALE RANGE SELECTOR switch.

2099. Set FULL SCALE RANGE SELECTOR (4) to .05.

2100. Use VOM to measure OHMS. Connect positive test lead to S3 (6), common test lead to S3 (5).

2101. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.

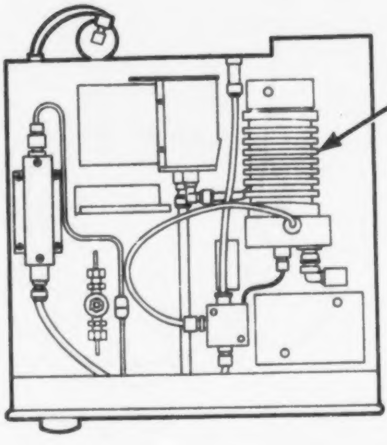


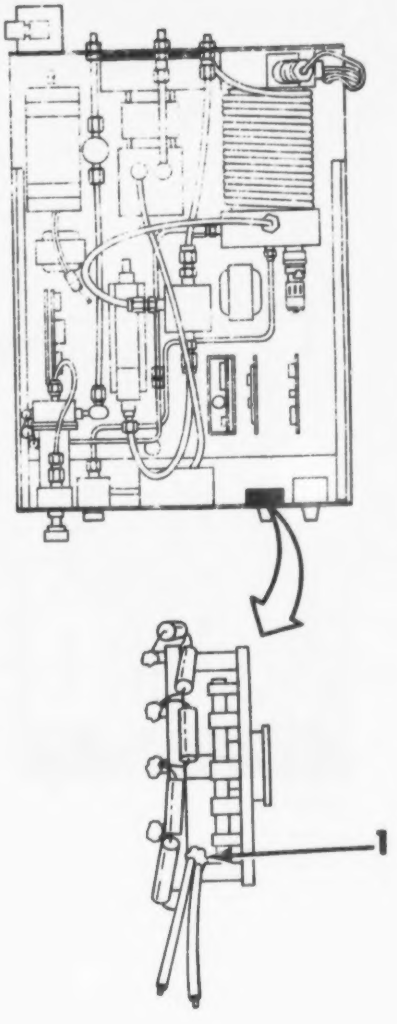
2102. Use VOM to measure OHMS. Connect positive test lead to S3 (1), common test lead to S3 (4).

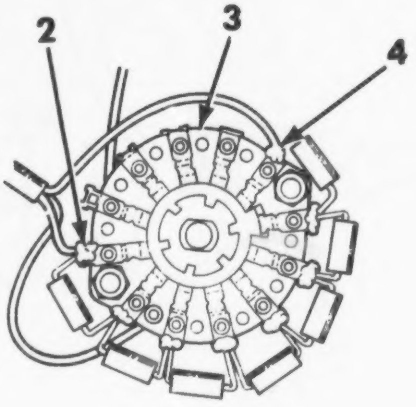
2103. Check that VOM indicates between 90K and 100K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (3). Go to step 1.

2104. Use VOM to measure OHMS. Connect positive test lead to S3 (1), common test lead to S3 (2).

2105. Check that VOM indicates between 4.75K and 5.25K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (3). Go to step 1.







2106. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2107. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2108. Replace Detector Cell (5), refer to Replace Detector Cell Assembly; page page 7-21

2109. Go to step 1.

2110. Check that O3 CONCENTRATION meter (7) indicates between 30 and 50. If not, go to step 2125.

2111. Check that Calibration Adjust (6) will adjust O3 CONCENTRATION meter (7) indication to 40. If not, go to step 2125.

2112. Set FULL SCALE RANGE SELECTOR (8) to .05.

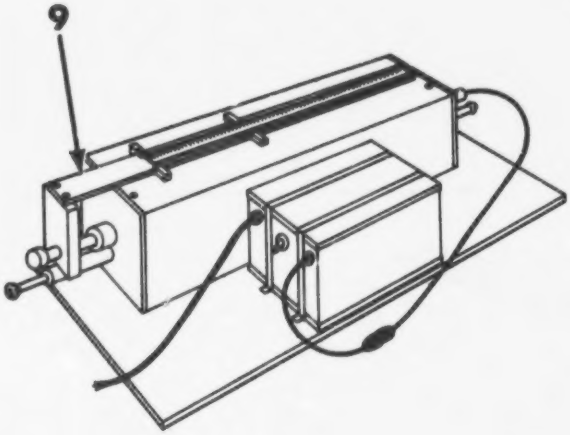
2113. Check that O3 CONCENTRATION meter (7) indicates between 14 and 18. If not, go to step 2125.

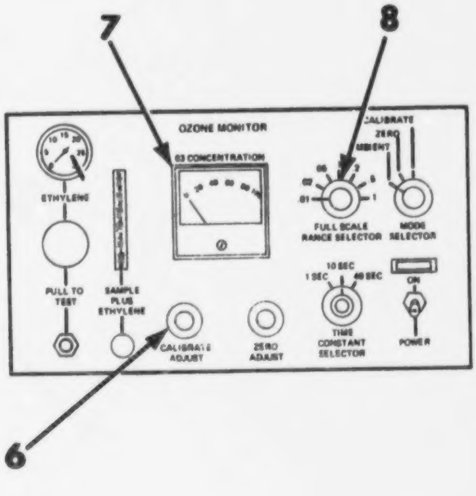
2114. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (9) to this setting.

2115. Set FULL SCALE RANGE SELECTOR (8) to .1.

2116. Check that O3 CONCENTRATION meter (7) indicates between 70 and 90. If not, go to step 2124.

2117. Set FULL SCALE RANGE SELECTOR (8) to .2.




7
8
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
10 SEC
1 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
6

2118. Check that O3 CONCENTRATION meter (1) indicates between 35 and 45. If not, go to step 2124.

2119. Set FULL SCALE RANGE SELECTOR (2) to .5.

2120. Check that O3 CONCENTRATION meter (1) indicates between 14 and 18. If not, go to step 2124.

2121. Set FULL SCALE RANCE SELECTOR (2) to 1.

2122. Check that O3 CONCENTRATION meter (1) indicates between 7 and 9. If not, go to step 2124.

2123. Go to step 81.

2124. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (3) to this setting.

2125. Set the POWER switch to OFF.

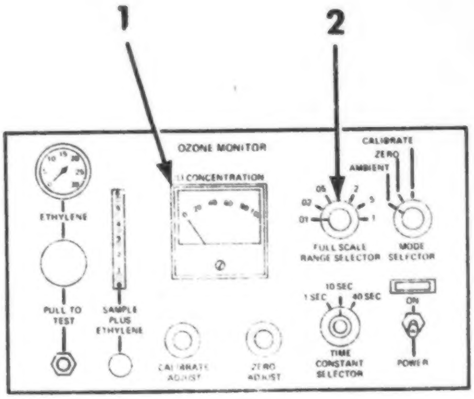
2126. Interchange Electrometer Amplifier PC Board (6) with a new one.

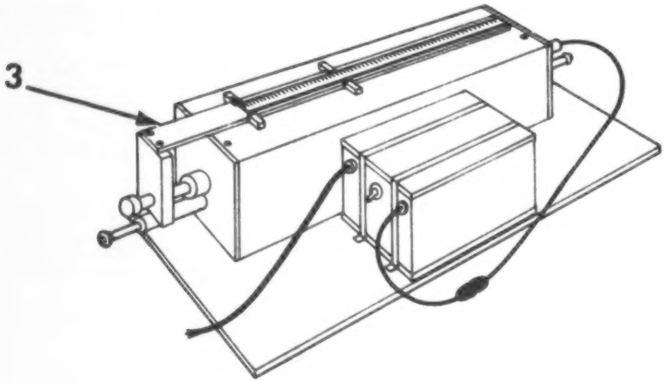
2127. Set the POWER switch to ON.

2128. Set FULL SCALE RANGE SELECTOR (2) to .02.

2129. When O3 CONCENTRATION meter (1) indication stabilizes, check that meter indicates between 35 and 45. If not, go to step 2131.

2130. Go to step 1.


1
2
OZONE MONITOR
CALIBRATE
ZERO
AMBIENT
ETHYLENE
O3 CONCENTRATION
.01
.02
.05
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER



2131. Set the POWER switch to OFF.

2132. Remove new Electrometer Amplifier PC Board (6) from monitor, reinstall old PC Board.

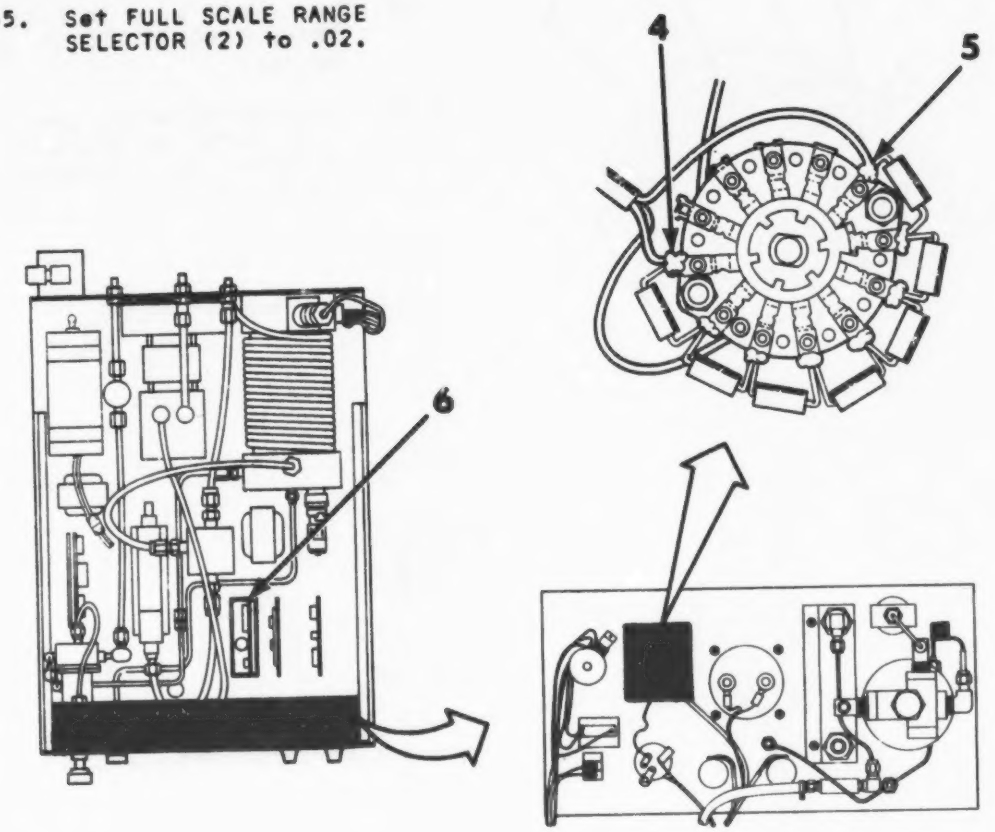
2133. Disconnect wire (5) from FULL SCALE RANGE SELECTOR switch.

2134. Disconnect wire (4) from FULL SCALE RANGE SELECTOR switch.

2135. Set FULL SCALE RANGE SELECTOR (2) to .02.

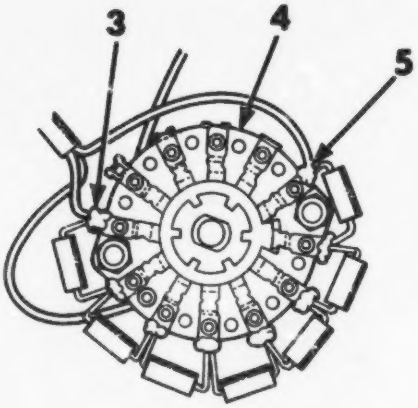
2136. Use VOM to measure OHMS. Connect positive test lead to S3 (5), common test lead to S3 (4).

2137. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.



2138. Use VOM to measure OHMS. Connect positive test lead to S3 (2), common test lead to S3 (5).

2139. Check that VOM indicates between 93K and 103K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (4). Go to step 1.



2140. Use VOM to measure OHMS. Connect positive test lead to S3 (2), common test lead to S3 (3).

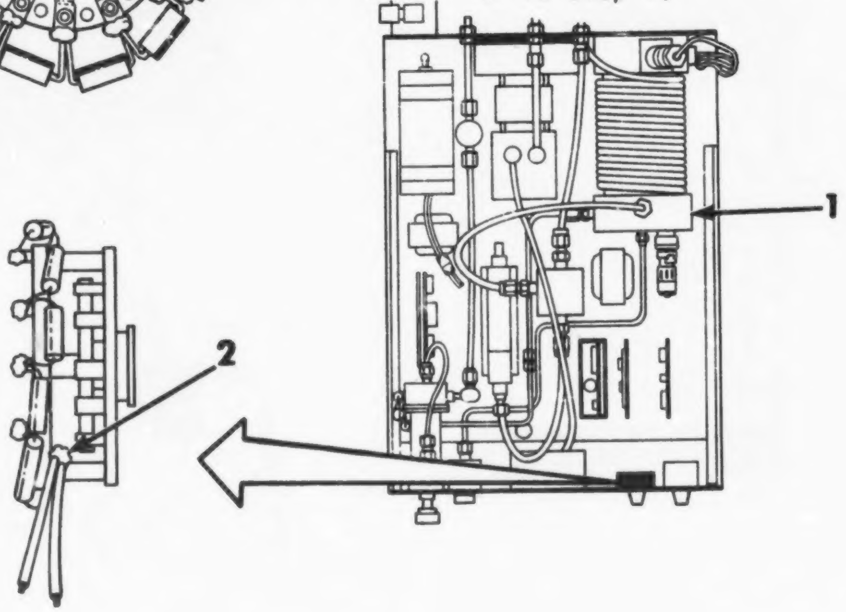
2141. Check that VOM indicates between 1.9K and 2.1K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (4). Go to step 1.

2142. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2143. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2144. Replace Detector Cell (1), refer to Replace Detector Cell Assembly; page 7-21.

2145. Go to step 1.



2146. Check that O3 CONCENTRATION meter (7) indicates between .30 and .50. If not, go to step 2161.

2147. Check that Calibration Adjust (6) will adjust O3 CONCENTRATION meter (7) indication to .40. If not, go to step 2161.

2148. Set FULL SCALE RANGE SELECTOR (8) to .05.

2149. Check that O3 CONCENTRATION meter (7) indicates between .14 and .18. If not, go to step 2161.

2150. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (9) to this setting.

2151. Set FULL SCALE RANGE SELECTOR (8) to .1.

2152. Check that O3 CONCENTRATION meter (7) indicates between .70 and .90. If not, go to step 2160.

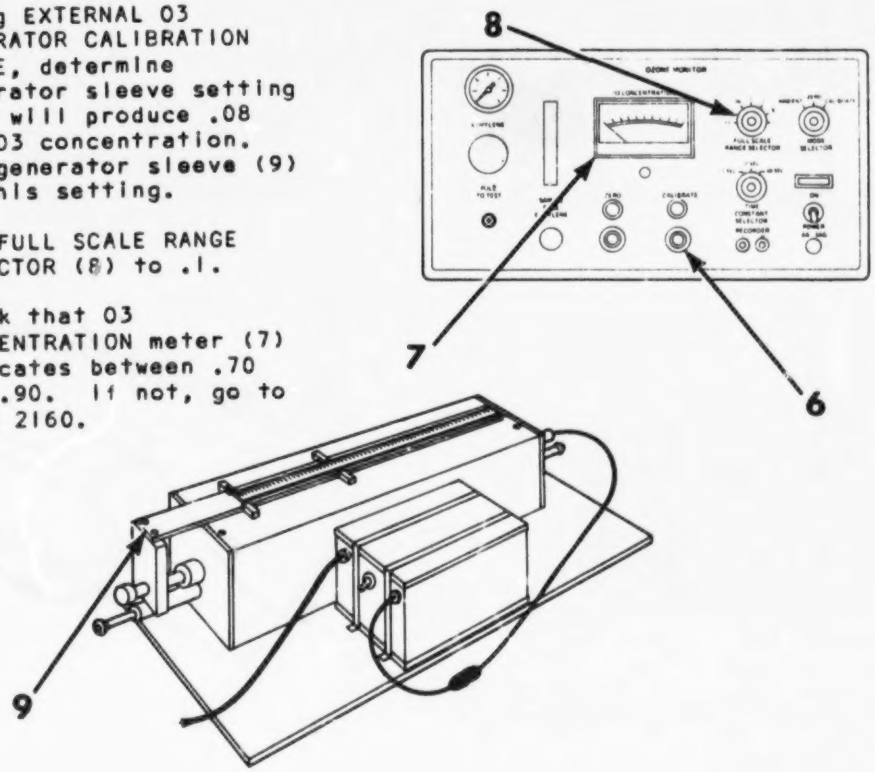
2153. Set FULL SCALE RANGE SELECTOR (8) to .2.

2154. Check that O3 CONCENTRATION meter (7) indicates between .35 and .45. If not, go to step 2160.

2155. Set FULL SCALE RANGE SELECTOR (8) to .5.

2156. Check that O3 CONCENTRATION meter (7) indicates between .14 and .18. If not, go to step 2160.

2157. Set FULL SCALE RANGE SELECTOR (8) to 1.



2158. Check that O3 CONCENTRATION meter (1) indicates between .07 and .09. If not, go to step 2160.

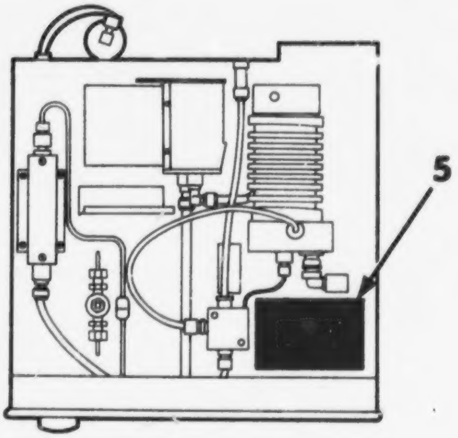
2159. Go to step 59.

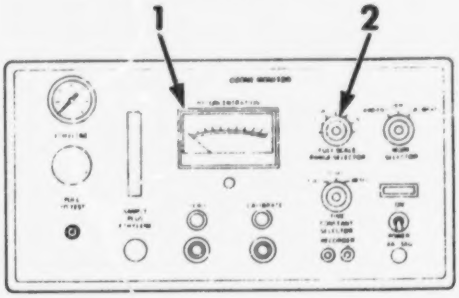
2160. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (3) to this setting.

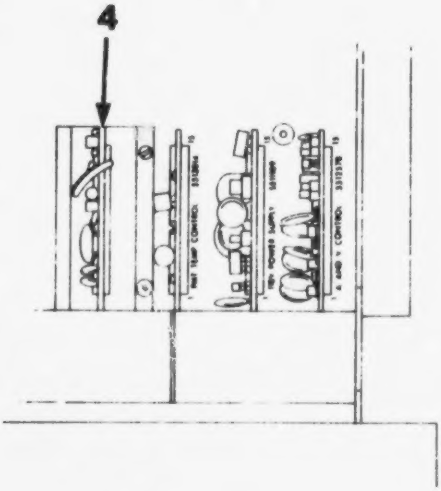
2161. Set the POWER switch to OFF.

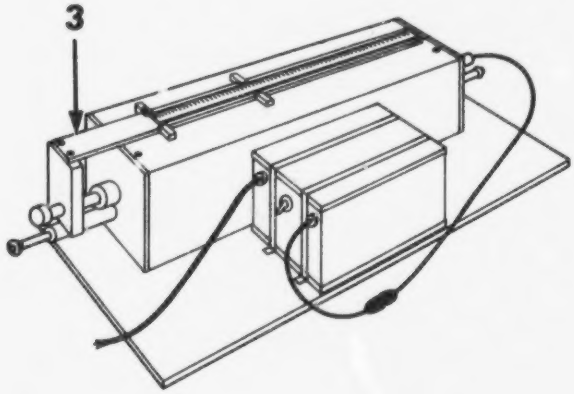
2162. Remove cover (5).

2163. Interchange Electrometer Amplifier PC Board (4) with a new one.









2164. Set the POWER switch to ON.

2165. Set FULL SCALE RANGE SELECTOR (2) to .02.

2166. When O3 CONCENTRATION meter (1) indication stabilizes, check that meter indicates between .35 and .45. If not, go to step 2169.

2167. Reinstall cover.

2168. Go to step 1.

2169. Set the POWER switch to OFF.

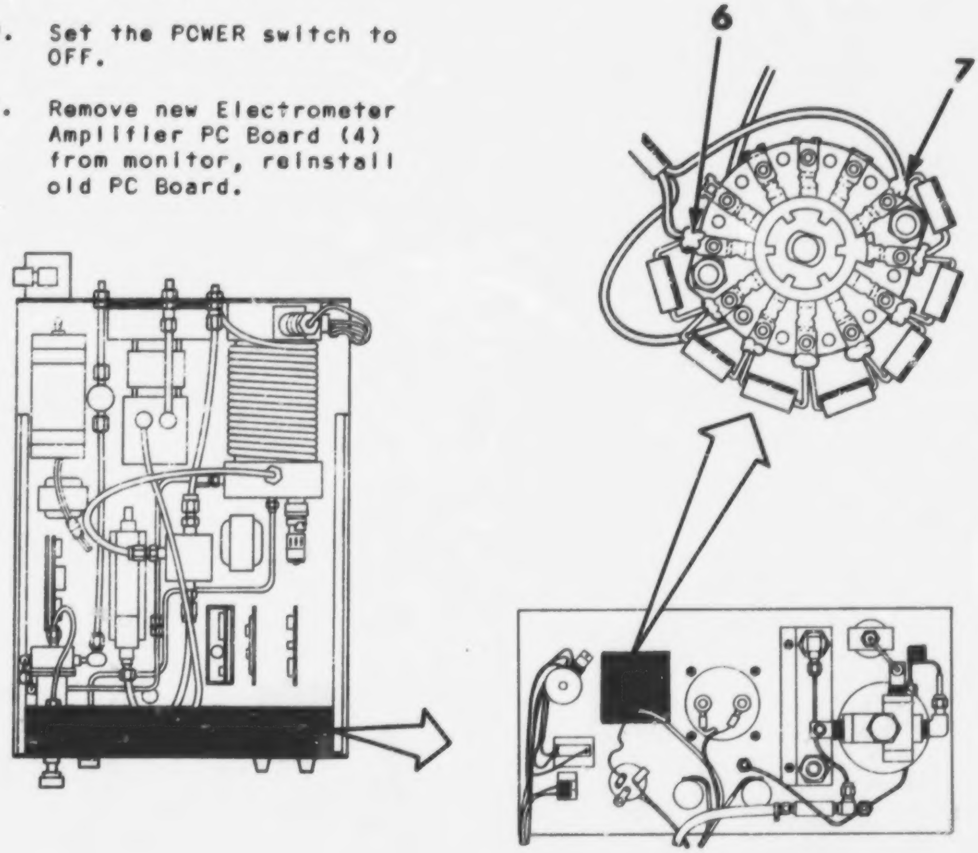
2170. Remove new Electrometer Amplifier PC Board (4) from monitor, reinstall old PC Board.

2171. Reinstall cover.

2172. Disconnect wire (7) from FULL SCALE RANGE SELECTOR switch.

2173. Disconnect wire (6) from FULL SCALE RANGE SELECTOR switch.

2174. Set FULL SCALE RANGE SELECTOR (2) to .02.



2175. Use VOM to measure OHMS. Connect positive test lead to S3 (4), common test lead to S3 (2).

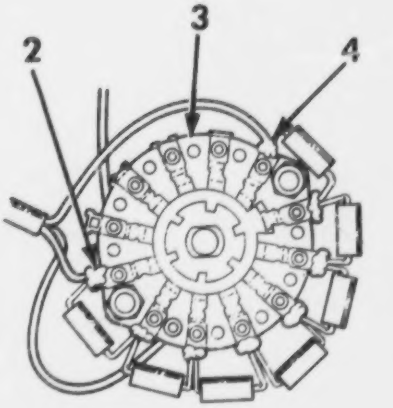
2176. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.

2177. Use VOM to measure OHMS. Connect positive test lead to S3 (1), common test lead to S3 (4).

2178. Check that VOM indicates between 93K and 103K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (3). Go to step 1.

2179. Use VOM to measure OHMS. Connect positive test lead to S3 (1), common test lead to S3 (2).

2180. Check that VOM indicates between 1.9K and 2.1K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (3). Go to step 1.



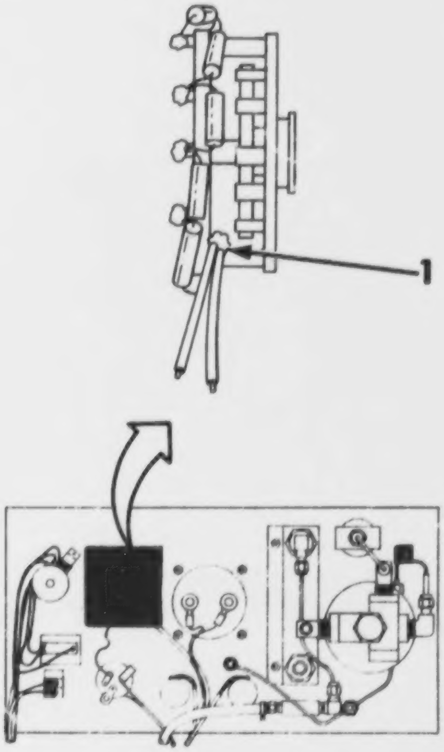
2181. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2182. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2183. Replace Detector Cell (9), refer to Replace Detector Cell Assembly; 7-21.

2184. Go to step 1.

2185. Check that O3 CONCENTRATION meter (6) indicates between 65 and 95. If not, go to step 2202.



2186. Check that Calibration Adjust (5) will adjust 03 CONCENTRATION meter (6) indication to 80. If not, go to step 2202.

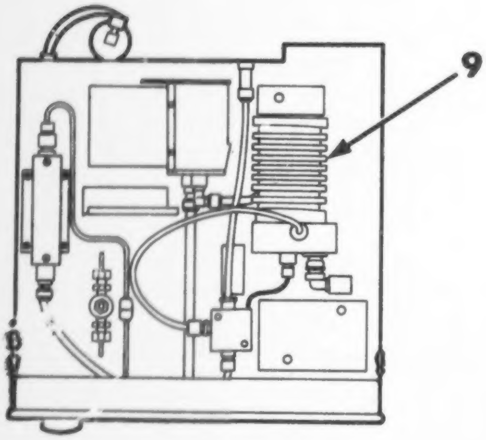
2187. Set FULL SCALE RANGE SELECTOR (7) to .02.

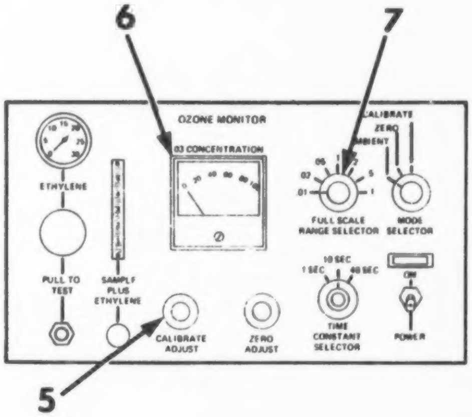
2188. Check that 03 CONCENTRATION meter (6) indicates between 35 and 45. If not, go to step 2202.

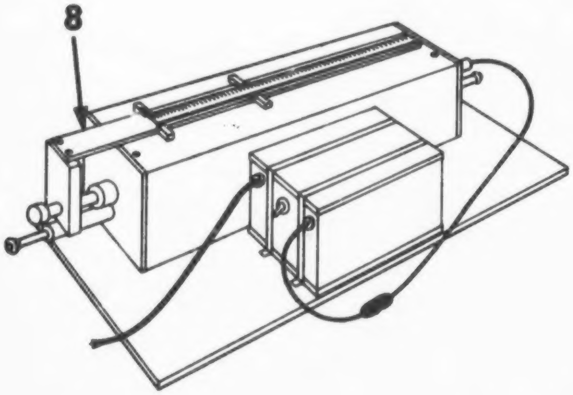
2189. Set FULL SCALE RANGE SELECTOR (7) to .05.

2190. Check that 03 CONCENTRATION meter (6) indicates between 14 and 18. If not, go to step 2202.

2191. Using EXTERNAL 03 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM 03 concentration. Set generator sleeve (8) to this setting.




6
7
OZONE MONITOR
03 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
FULL SCALE RANGE SELECTOR
MODE SELECTOR
CALIBRATE
ZERO
AMBIENT
10 SEC
1 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
5



2192. Set FULL SCALE RANGE SELECTOR (2) to .1.

2193. Check that O3 CONCENTRATION meter (1) indicates between 70 and 90. If not, go to step 2201.

2194. Set FULL SCALE RANGE SELECTOR (2) to .2.

2195. Check that O3 CONCENTRATION meter (1) indicates between 35 and 45. If not, go to step 2201.

2196. Set FULL SCALE RANGE SELECTOR (2) to .5.

2197. Check that O3 CONCENTRATION meter (1) indicates between 14 and 18. If not, go to step 2201.

2198. Set FULL SCALE RANGE SELECTOR (2) to 1.

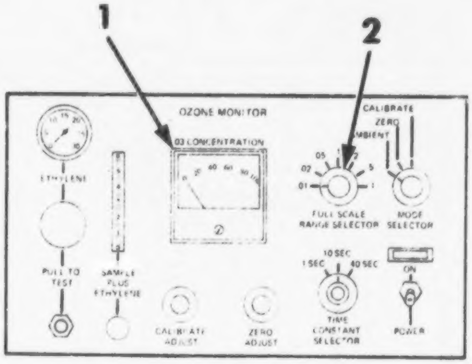
2199. Check that O3 CONCENTRATION meter (1) indicates between 7 and 9. If not, go to step 2201.

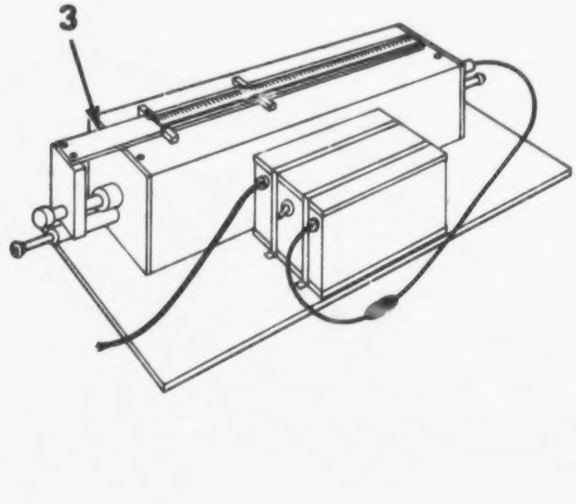
2200. Go to step 81.

2201. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (3) to this setting.

2202. Set the POWER switch to OFF.

2203. Interchange Electrometer Amplifier PC Board (6) with a new one.


1
2
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
FULL SCALE RANGE SELECTOR
.01
.02
.05
.1
.2
.5
1
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER



2204. Set the POWER switch to ON.

2205. Set FULL SCALE RANGE SELECTOR (2) to .01.

2206. When O3 CONCENTRATION meter (1) indication stabilizes, check that meter indicates between 70 and 90. If not, go to step 2208.

2207. Go to step i.

2208. Set the POWER switch to OFF.

2209. Remove new Electrometer Amplifier PC Board (6) from monitor, reinstall old PC Board.

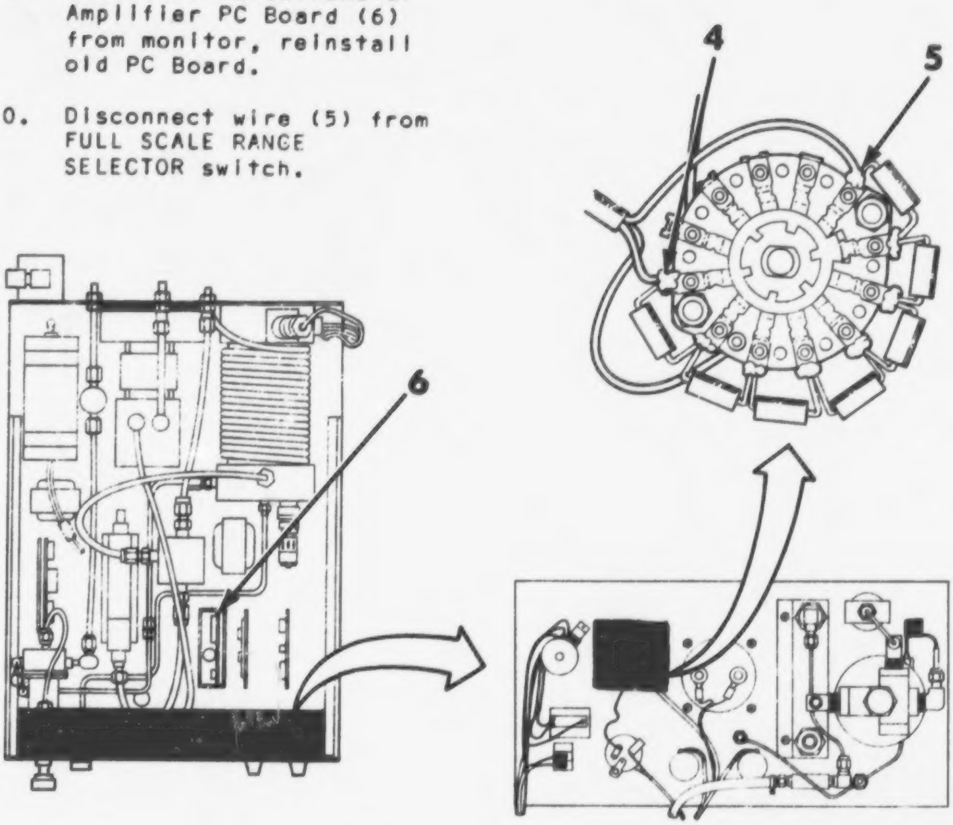
2210. Disconnect wire (5) from FULL SCALE RANGE SELECTOR switch.

2211. Disconnect wire (4) from FULL SCALE RANGE SELECTOR switch.

2212. Set FULL SCALE RANGE SELECTOR (2) to .01.

2213. Use VOM to measure OHMS. Connect positive test lead to S3 (5), common test lead to S3 (4).

2214. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2462.



2215. Use VOM to measure OHMS. Connect positive test lead to S3 (2), common test lead to S3 (5).

2216. Check that VOM indicates between 94K and 104K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (4). Go to step 1.

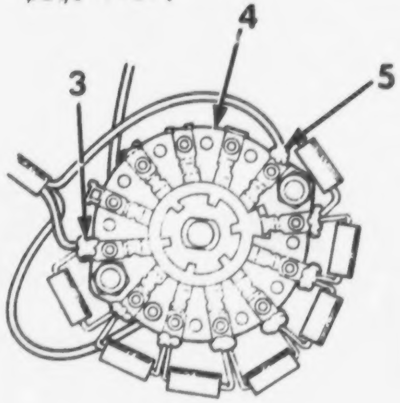
2217. Use VOM to measure OHMS. Connect positive test lead to S3 (2), common test lead to S3 (3).

2218. Check that VOM indicates between 900 ohms and 1.1K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (4). Go to step 1.

2219. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

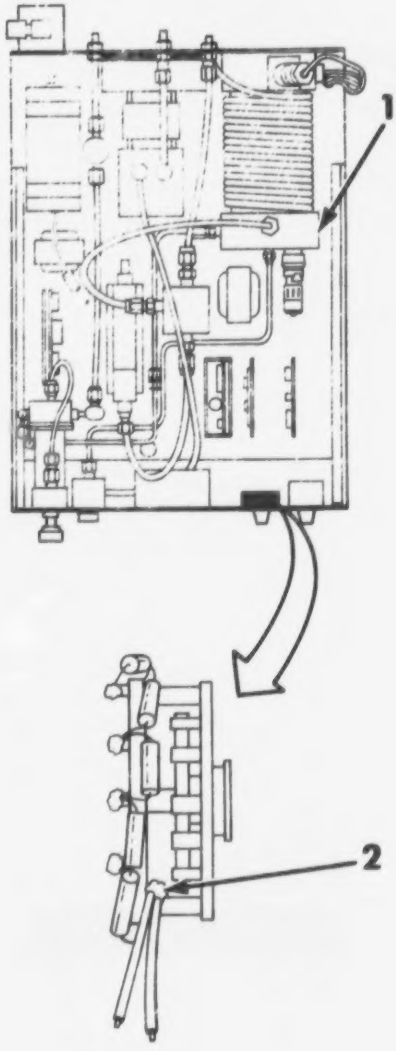
2220. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2221. Replace Detector Cell (1), refer to Replace Detector Cell Assembly; page 7-21.



2222. Go to step 1.

2223. Check that O3 CONCENTRATION meter (6) indicates between .65 and .95. If not, go to step 2240.



2224. Check that Calibration Adjust (8) will adjust O3 CONCENTRATION meter (6) indication to .80. If not, go to step 2240.

2225. Set FULL SCALE RANGE SELECTOR (7) to .02.

2226. Check that O3 CONCENTRATION meter (6) indicates between .35 and .45. If not, go to step 2240.

2227. Set FULL SCALE RANGE SELECTOR (7) to .05.

2228. Check that O3 CONCENTRATION meter (6) indicates between .14 and .18. If not, go to step 2240.

2229. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (9) to this setting.

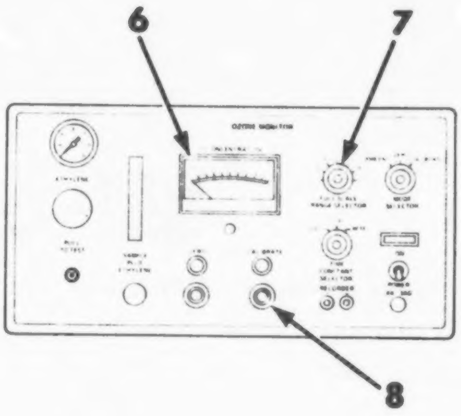
2230. Set FULL SCALE RANGE SELECTOR (7) to .1.

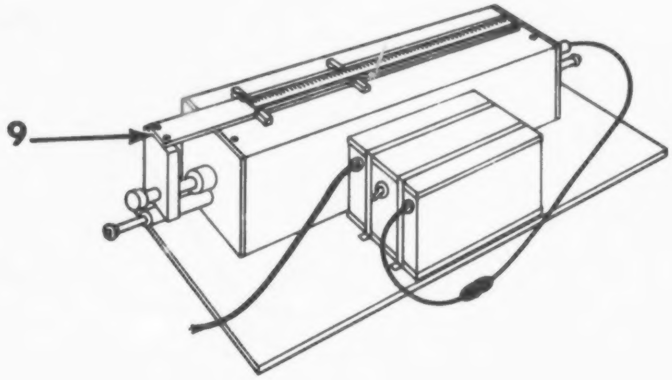
2231. Check that O3 CONCENTRATION meter (6) indicates between 70 and 90. If not, go to step 2239.

2232. Set FULL SCALE RANGE SELECTOR (7) to .2.

2233. Check that O3 CONCENTRATION meter (6) indicates between .35 and .45. If not, go to step 2239.

2234. Set FULL SCALE RANGE SELECTOR (7) to .5.





2235. Check that O3 CONCENTRATION meter (1) indicates between 14 and 18. If not, go to step 2239.

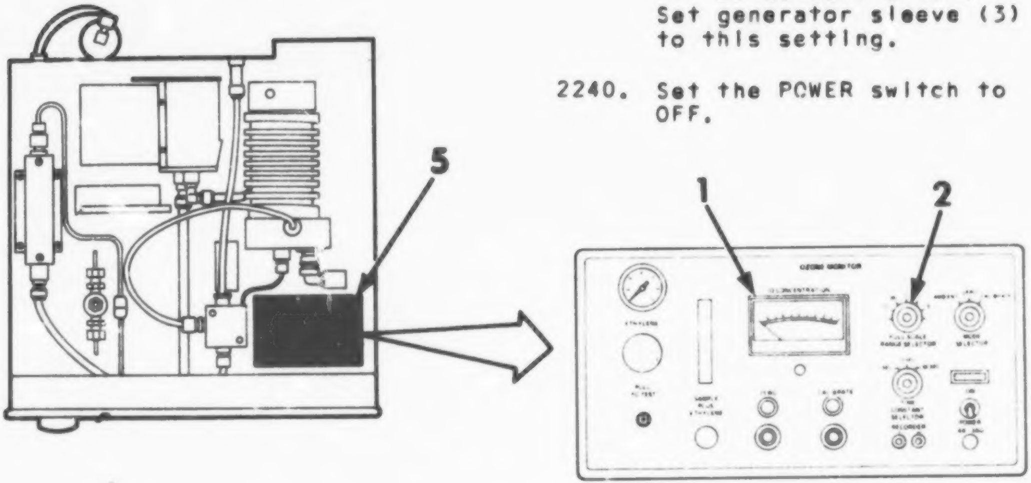
2236. Set FULL SCALE RANGE SELECTOR (2) to 1.

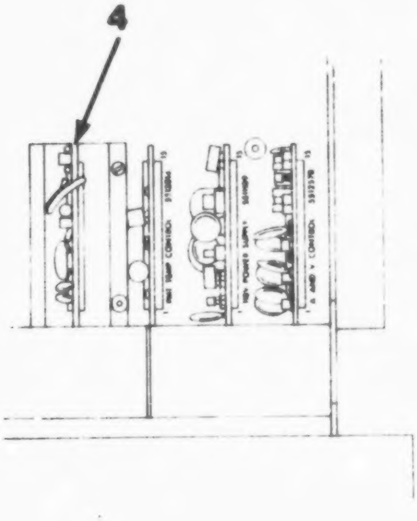
2237. Check that O3 CONCENTRATION meter (1) indicates between .07 and .09. If not, go to step 2239.

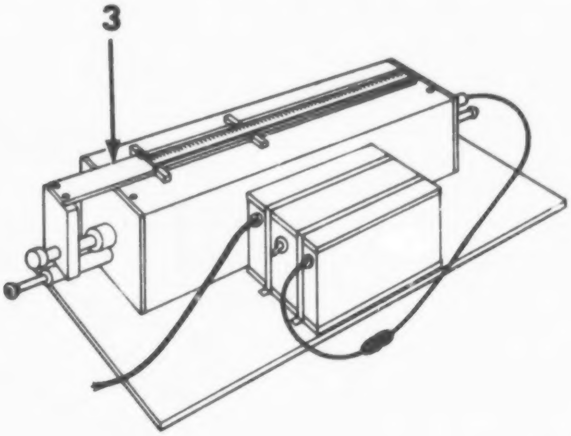
2238. Go to step 59.

2239. Using EXTERNAL O3 GENERATOR CALIBRATION CURVE, determine generator sleeve setting that will produce .08 PPM O3 concentration. Set generator sleeve (3) to this setting.

2240. Set the POWER switch to OFF.







2241. Remove cover (5).

2242. Interchange Electrometer Amplifier PC Board (4) with a new one.

2243. Set the POWER switch to ON.

2244. Set FULL SCALE RANGE SELECTOR (2) to .01.

2245. When O3 CONCENTRATION meter (1) indication stabilizes, check that meter indicates between .70 and .90. If not, go to step 2248.

2246. Reinstall cover.

2247. Go to step 1.

2248. Set the POWER switch to OFF.

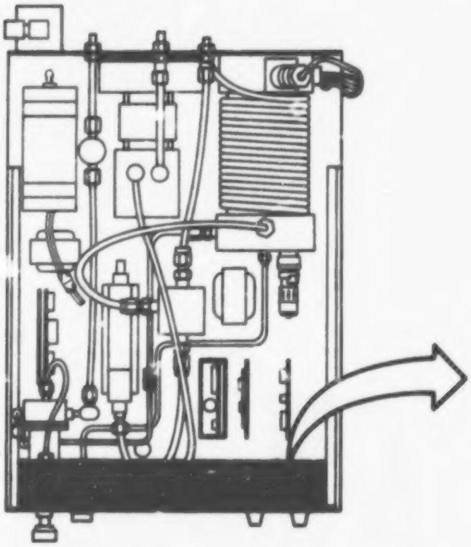
2249. Remove new Electrometer Amplifier PC Board (4) from monitor, reinstall old PC Board.

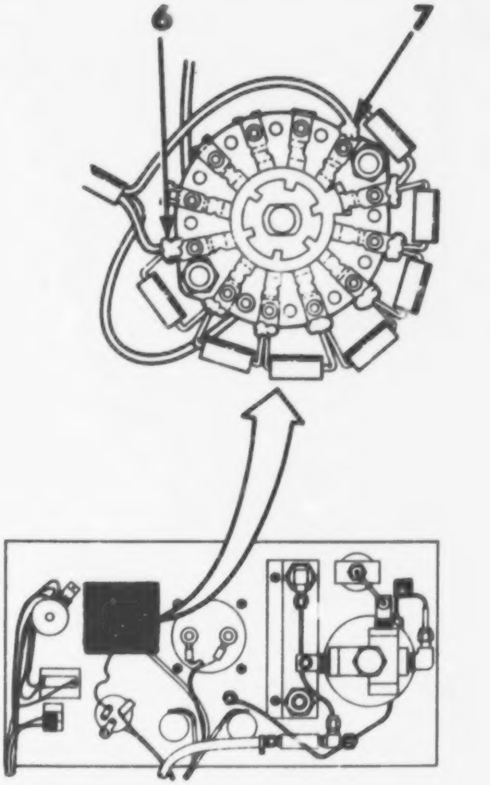
2250. Reinstall cover.

2251. Disconnect wire (7) from FULL SCALE RANGE SELECTOR switch.

2252. Disconnect wire (6) from FULL SCALE RANGE SELECTOR switch.

2253. Set FULL SCALE RANGE SELECTOR (2) to .01.





2254. Use VOM to measure OHMS. Connect positive test lead to S3 (3), common test lead to S3 (1).

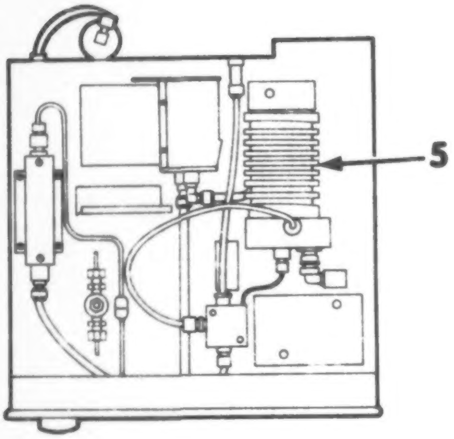
2255. Check that VOM indicates between 95K and 105K ohms. If not, go to step 2482.

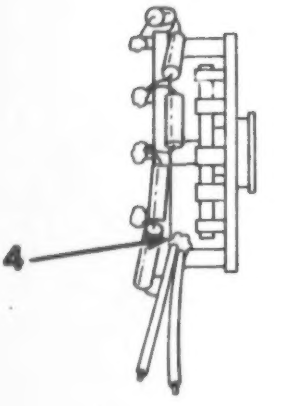
2256. Use VOM to measure OHMS. Connect positive test lead to S3 (4), common test lead to S3 (3).

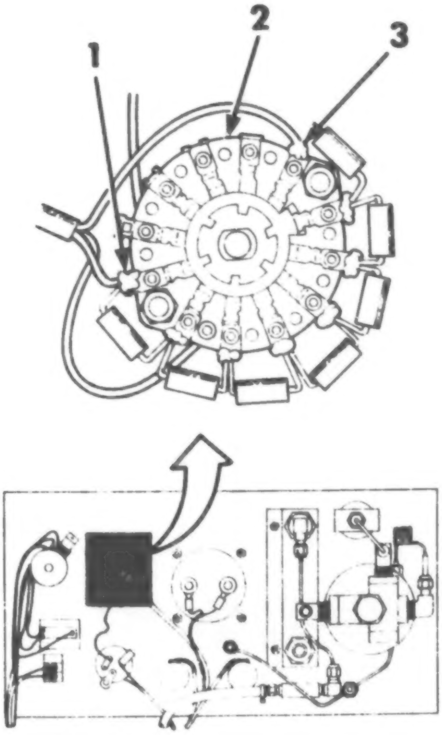
2257. Check that VOM indicates between 94K and 104K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (2). Go to step 1.

2258. Use VOM to measure OHMS. Connect positive test lead to S3 (4), common test lead to S3 (1).

2259. Check that VOM indicates between 900 ohms and 1.1K ohms. If not, replace FULL SCALE RANGE SELECTOR switch (2). Go to step 1.







2260. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2261. Reconnect wire to FULL SCALE RANGE SELECTOR switch.

2262. Replace Detector Cell (5), refer to Replace Detector Cell Assembly; page 7-21.

2263. Go to step 1.

2264. Check that O3 CONCENTRATION meter indicates between 6 and 10. If not, go to step 2267.

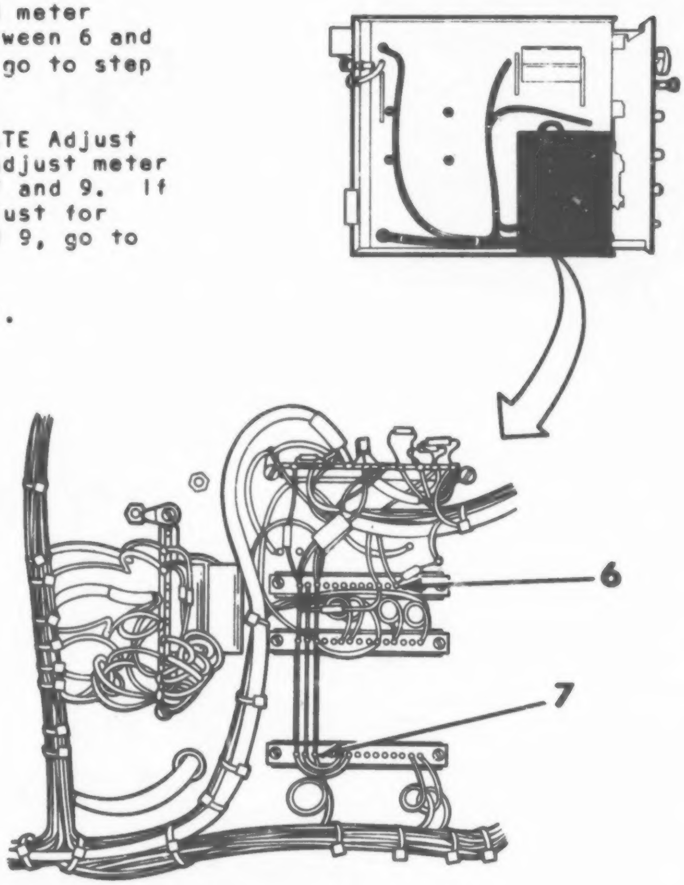
2265. Using CALIBRATE Adjust Micrometer, adjust meter for between 7 and 9. If unable to adjust for between 7 and 9, go to step 2267.

2266. Go to step 81.

2267. Use VOM to measure VDC. Connect positive test lead to J1 pin 4 (6) common test lead to J3 pin 13 (7).

2268. Check that VOM indicates between 7 and 9 VDC. If not go to step 2281.

2269. Set the POWER switch to OFF.



2270. Disconnect AC power from monitor.

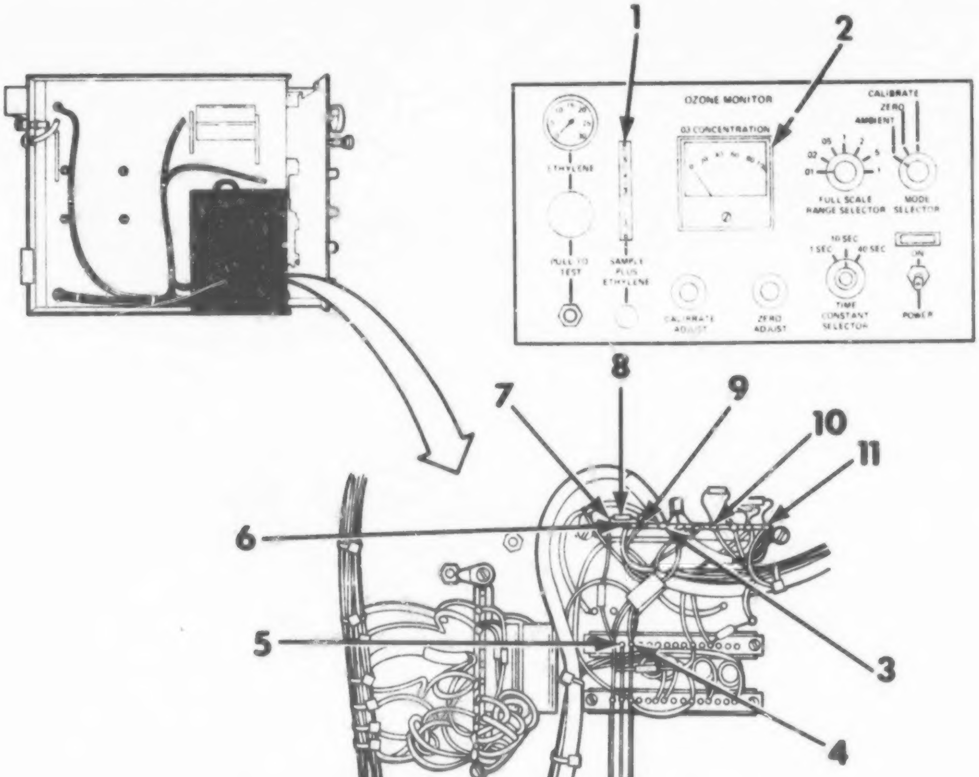
2271. Use VOM to measure OHMS. Connect positive test lead to terminal (10), common test lead to meter terminal (13).

2272. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 1.

2273. Use VOM to measure OHMS. Connect positive test lead to terminal (11), common test lead to meter terminal (14).

2274. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 1.

2275. Disconnect resistor lead (7) from terminal.


1
2
OZONE MONITOR
CALIBRATE
ZERO
AMBIENT
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
1 SEC
10 SEC
40 SEC
ON
TIME CONSTANT SELECTOR
POWER
CALIBRATE ADJUST
ZERO ADJUST
8
7
9
10
11
6
5
3
4

2276. Use VOM to measure OHMS. Connect positive test lead to resistor lead (7), common test lead to terminal (9).

2277. Check that VOM indicates between .9 and 1.1M ohms. If not, replace resistor R4 (8). Go to step 1.

2278. Replace 03 CONCENTRATION meter (2).

2279. Reconnect resistor lead to terminal (6).

2280. Go to step 1.

2281. Seal air inlet (12) and check that SAMPLE PLUS ETHYLENE flow gauge (1) indication remains steady. If not, go to step 2354.

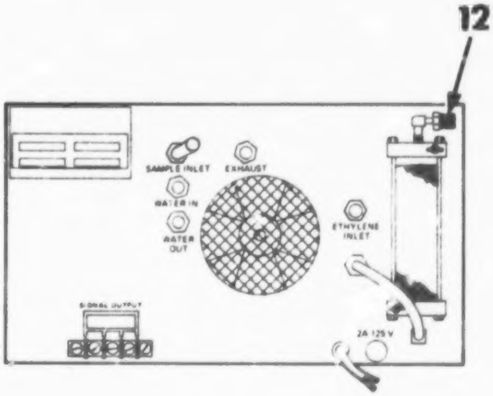
2282. Clear air inlet (12).

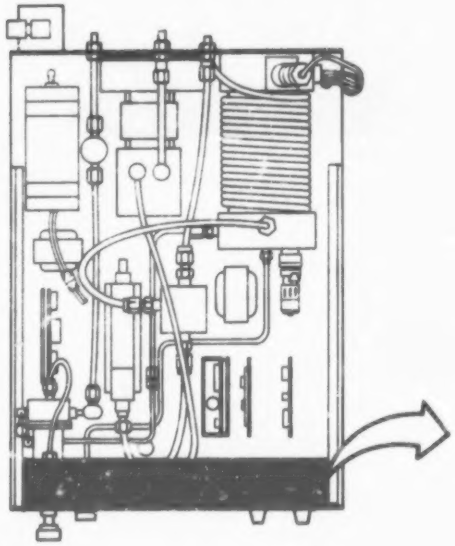
2283. Use VOM to measure VDC. Connect positive test lead to J1 pin 13 (4), common test lead to J1 pin 14 (5).

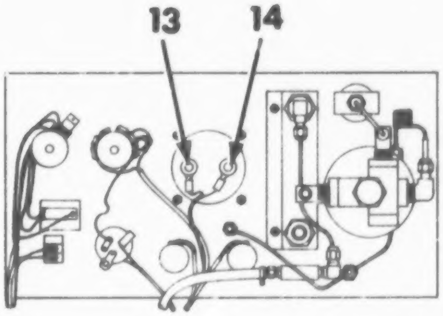
2284. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1349.

2285. Use VOM to measure VDC. Connect positive test lead to terminal (3), common test lead to J3 pin 13 (4).

2286. Check that VOM indicates between 50 and 85 VDC. If not, go to step 2290.







2287. Interchange Electrometer Amplifier PC Board (2) with a new one.

2288. Using CALIBRATE Adjust Micrometer, adjust meter for between 7 and 9. If unable to adjust for between 7 and 9, go to step 2297.

2289. Go to step 1.

2290. Check that VOM indication was low. If not, go to step 2324.

2291. Set the POWER switch to OFF.

2292. Disconnect PE (1) from detector cell.

2293. Set the POWER switch to ON.

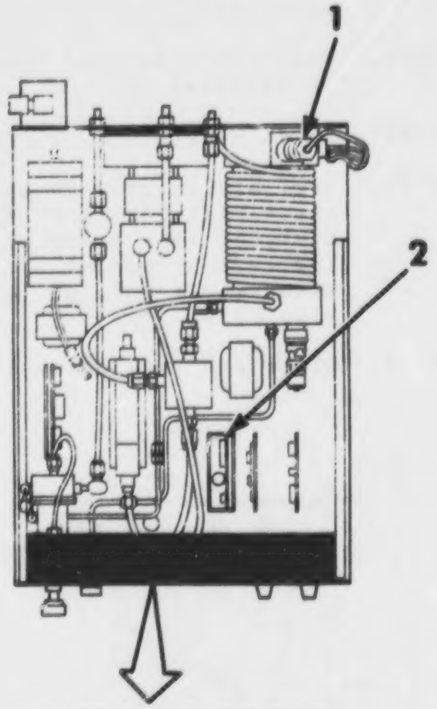
2294. Use VOM to measure VDC. Connect positive test lead to terminal (6), common test lead to J3 pin 13 (5).

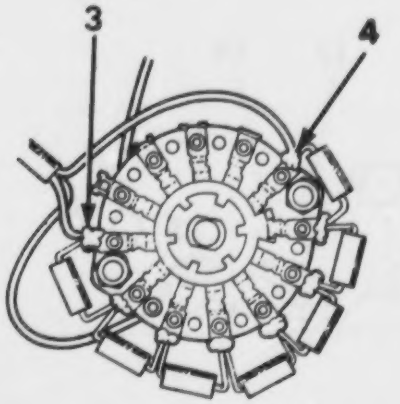
2295. Check that VOM indicates between 50 and 85 VDC. If not, go to step 2331.

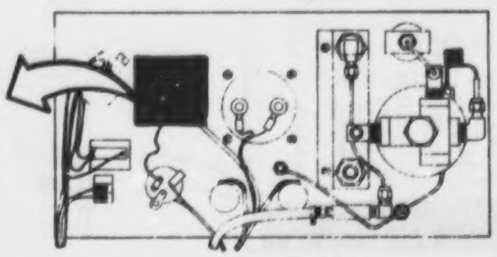
2296. Next, Replace Detector Cell Assembly, procedure begins at page 7-21 . Go on to step 1 when finished.

2297. Set the POWER switch to OFF.

2298. Disconnect AC power from monitor.







2299. Reinstall Electrometer Amplifier P.C. Board.

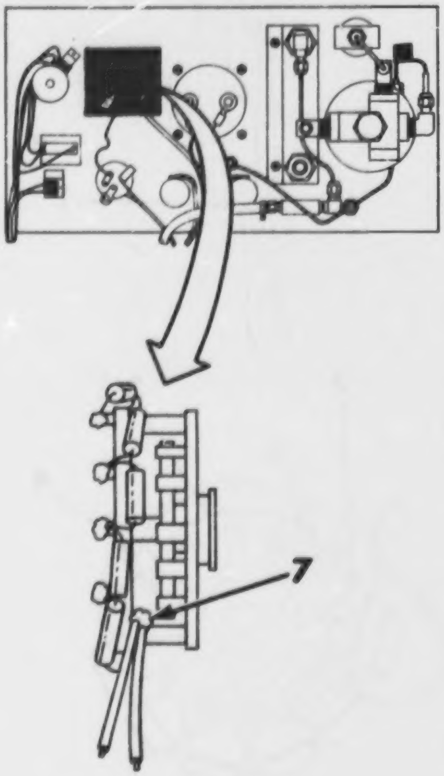
2300. Disconnect and tag lead (4).

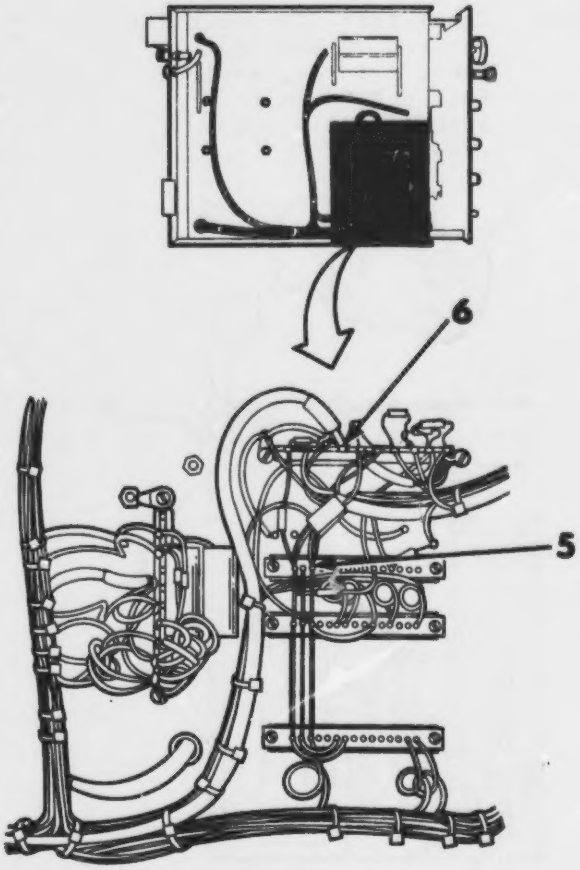
2301. Disconnect and tag lead (3).

2302. Disconnect and tag lead (7).

2303. Use VOM to measure OHMS. Connect positive test lead to terminal (4), common test lead to terminal (3).

2304. Check that VOM indicates between 95 and 105K ohms. If not, go to step 2491.





2305. Use VOM to measure OHMS. Connect positive test lead to terminal (1), common test lead to terminal (4).

2306. Check that VOM indicates 5 ohms or less. If not, replace FULL SCALE RANGE SELECTOR (3). Go to step 1.

2307. Use VOM to measure OHMS. Connect positive test lead to terminal (1), common test lead to terminal (2).

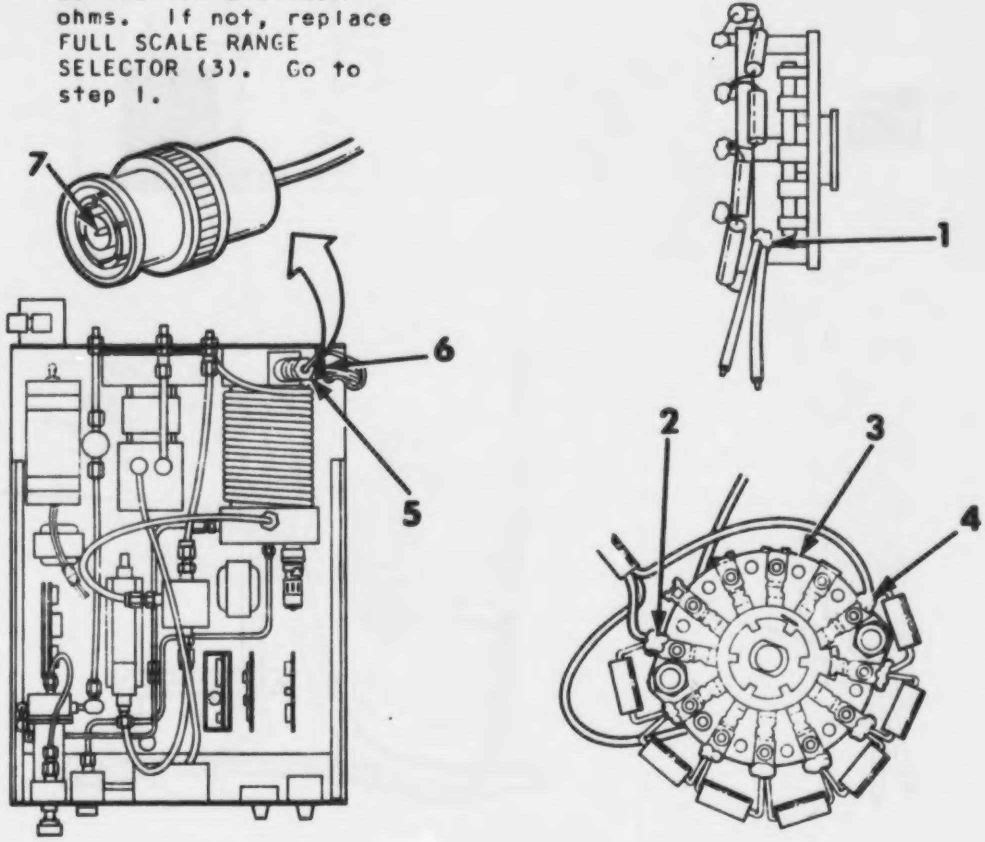
2308. Check that VOM indicates between 95 and 105K ohms. If not, replace FULL SCALE RANGE SELECTOR (3). Go to step 1.

2309. Reconnect wire to terminal (4).

2310. Reconnect wire to terminal (2).

2311. Reconnect wire to terminal (1).

2312. Disconnect P7 (6) from detector cell.



2313. Use VOM to measure OHMS. Connect positive test lead to P7 center conductor (7), common test lead to connector (9).

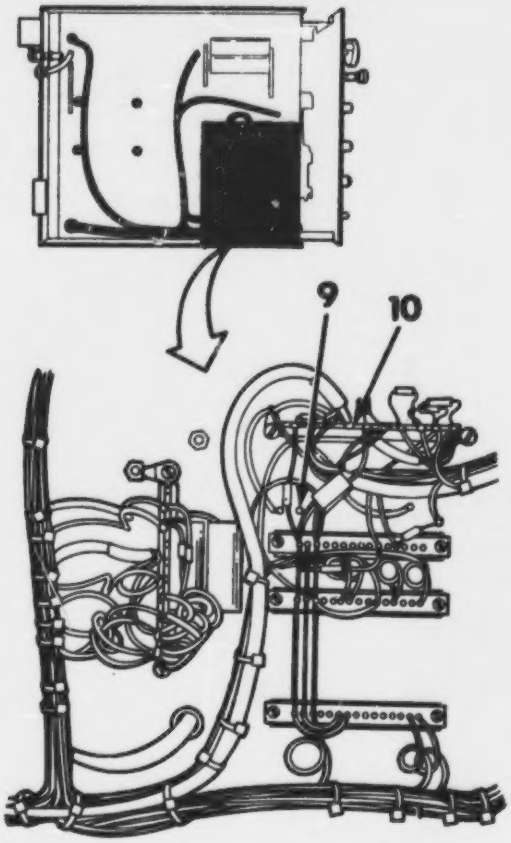
2314. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2320.

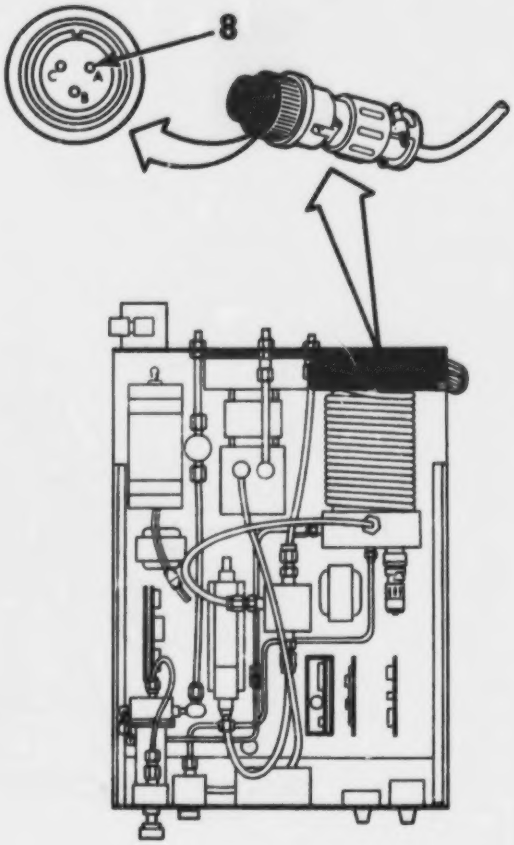
2315. Reconnect P7 to detector cell.

2316. Disconnect P6 (5) from detector cell.

2317. Use VOM to measure OHMS. Connect positive test lead to P6 pin A (8), common test lead to terminal (10).

2318. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2322.





2319. Next, Replace Detector Cell Assembly, procedure begins at page 7-21. Go on to step 1 when finished.

2320. Reconnect P7 to detector cell.

2321. Go to step 1.

2322. Reconnect P6 to detector cell.

2323. Go to step 1.

2324. Set the POWER switch to OFF.

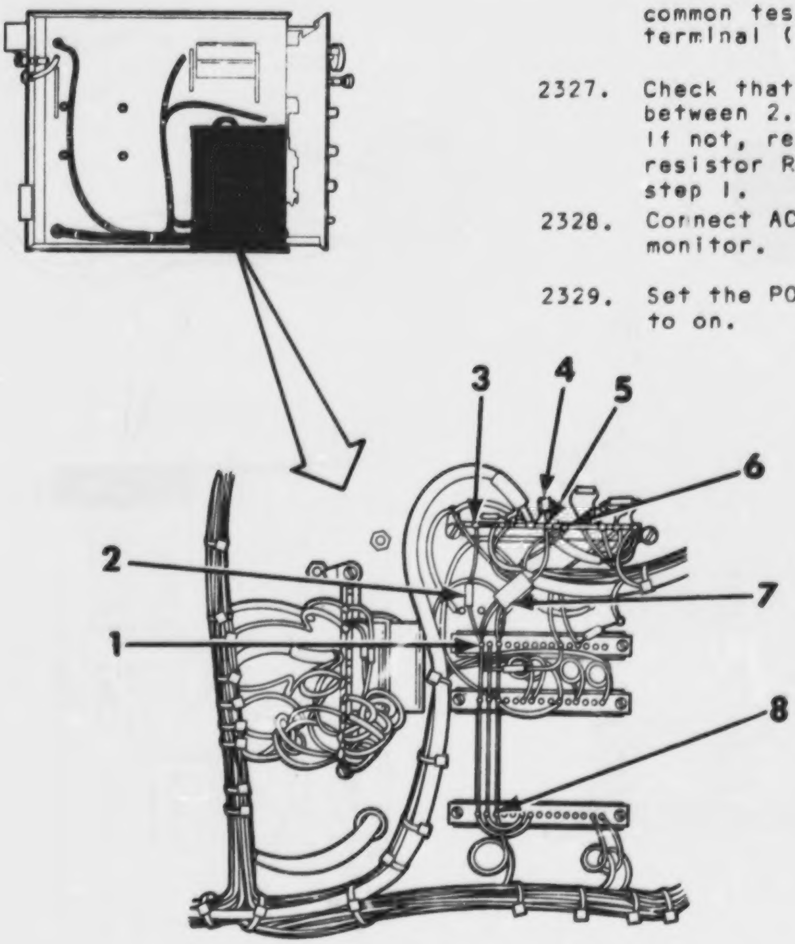
2325. Disconnect AC power from monitor.

2326. Use VOM to measure OHMS. Connect positive test lead to J1 pin 15 (1), common test lead to terminal (3).

2327. Check that VOM indicates between 2.5 and 3K ohms. If not, replace resistor R16 (2). Go to step 1.

2328. Connect AC power to monitor.

2329. Set the POWER switch to on.



2330. Go to step 2334.

2331. Use VOM to measure VDC. Connect positive test lead to terminal (5), common test lead to J3 pin 13 (8).

2332. Check that VOM indicates between 95 and 105 VDC. If not, go to step 2336.

2333. Reconnect P6 to detector cell.

2334. Use VOM to measure VDC. Connect positive test lead to terminal (6), common test lead to J3 pin 13 (8).

2334.5 While observing VOM, rotate CALIBRATE Adjust Micrometer fully clockwise and counterclockwise. Check that VOM indication varies between 55 and 80 VDC. If, not, go to step 2339 .

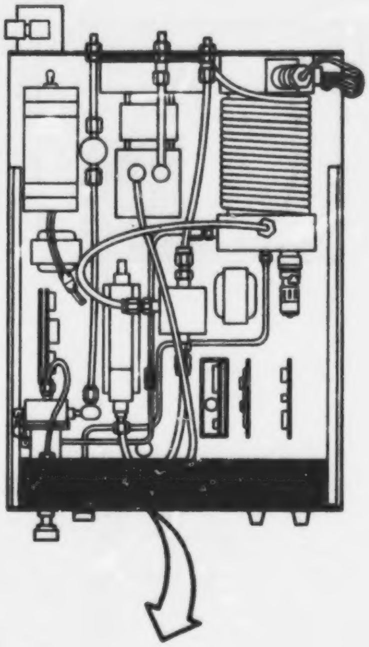
2335. Replace transistor Q1 (4). Go to step 1.

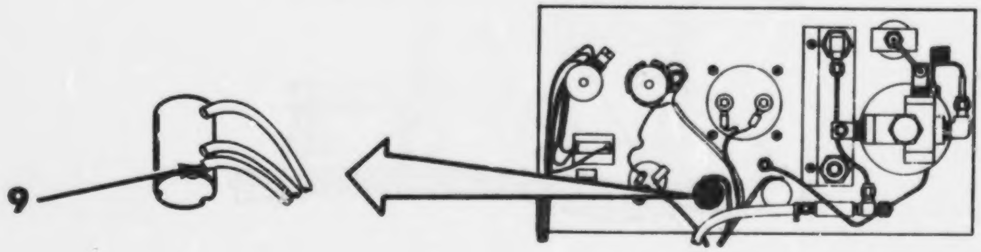
2336. Replace resistor R16 (7).

2337. Reconnect P6 to detector cell.

2338. Go to step 1.

2339. Use VOM to measure VDC. Connect positive test lead to R14 terminal (9), common test lead to J3 pin 13 (8).





2340. While observing VOM, rotate CALIBRATE Adjust Micrometer fully clockwise and counterclockwise. Check that VOM indication varies between 55 and 80 VDC. If not, go to step 2342.

2341. Repair or replace wiring and connectors as necessary. Go to step 1.

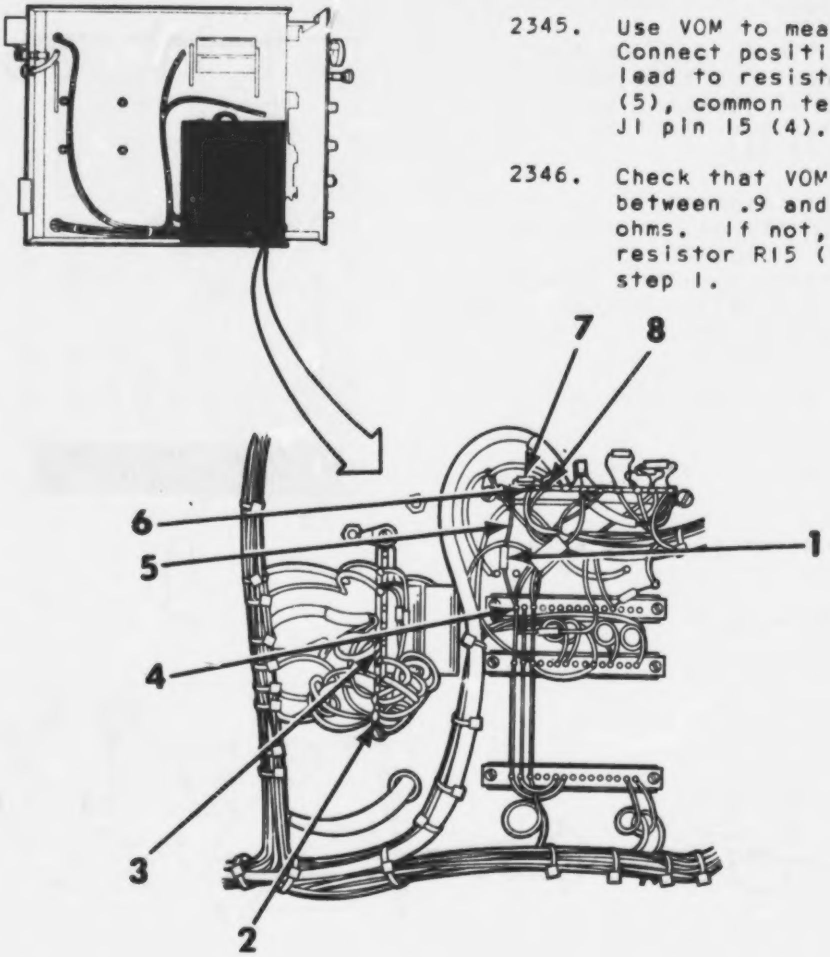
2342. Set the POWER switch to OFF.

2343. Disconnect AC power from monitor.

2344. Disconnect resistor lead (5) from terminal.

2345. Use VOM to measure OHMS. Connect positive test lead to resistor lead (5), common test lead to J1 pin 15 (4).

2346. Check that VOM indicates between .9 and 1.1K ohms. If not, replace resistor R15 (1). Go to step 1.



2347. Use VOM to measure OHMS. Connect positive test lead to R14 terminal (11), common test lead to R14 terminal (9).

2348. Check that VOM indicates between 18 and 22K ohms. If not, replace Potentiometer R14 (10). Go to step 2352.

2349. Use VOM to measure OHMS. Connect positive test lead to terminal (8), common test lead to terminal (6).

2350. Check that VOM indicates between 28 and 32K ohms. If not, replace resistor R13 (7). Go to step 2352.

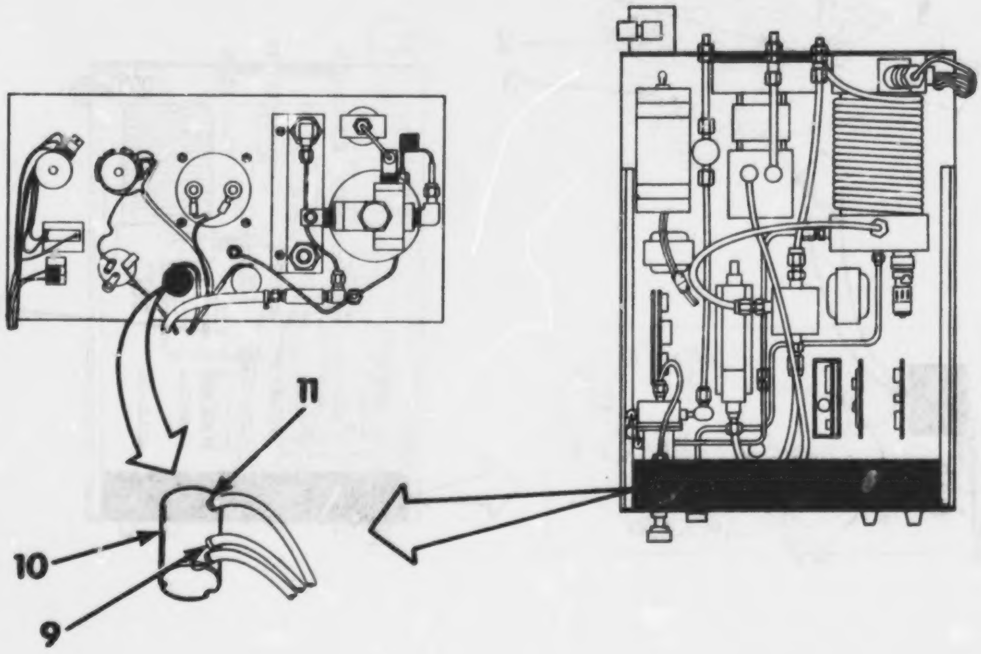
2351. Repair or replace wiring and connectors as necessary.

2352. Reconnect resistor lead to terminal (4).

2353. Go to step 1.

2354. Use VOM to measure VAC. Connect positive test lead to terminal (3), common test lead to terminal (2).

2355. Check that VOM indicates 5 VAC or less. If not, go to step 2357.



2356. Replace Selector Solenoid Valve (1). Go to step 1.

2357. Set the POWER switch to OFF.

2358. Disconnect AC power from monitor.

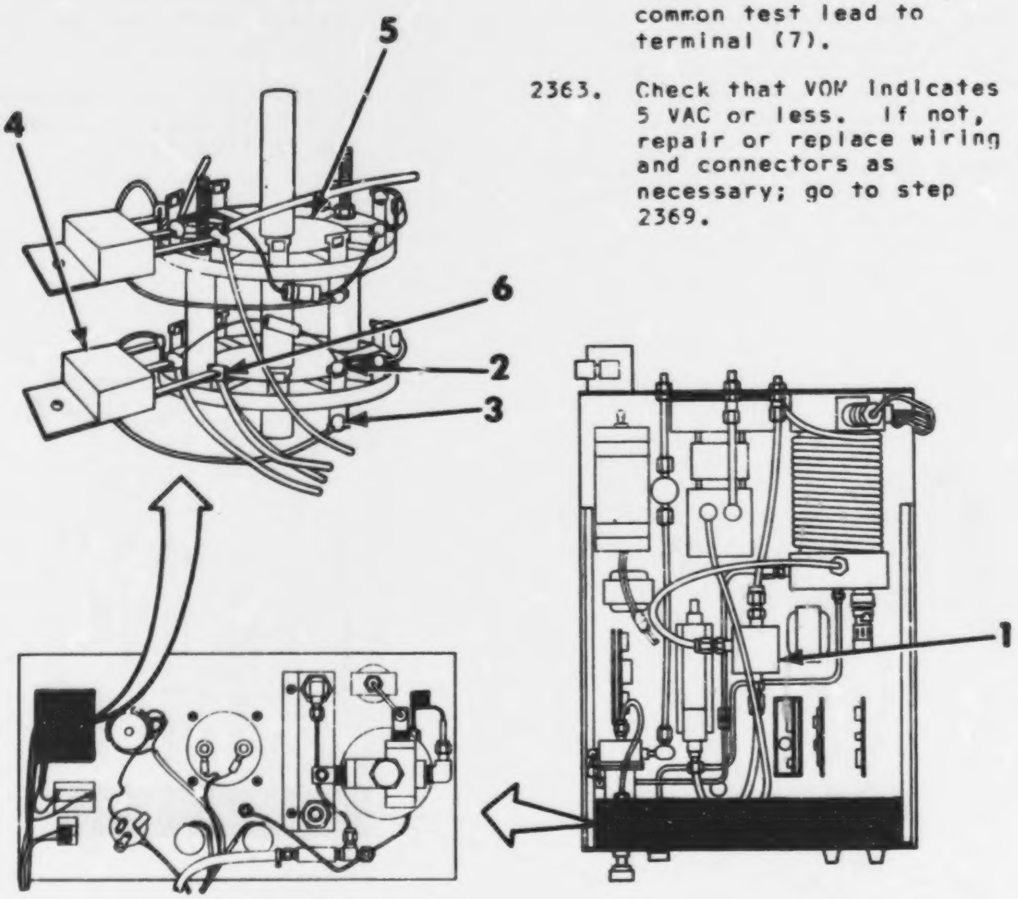
2359. Disconnect triac lead (6) from terminal.

2360. Connect AC power to monitor.

2361. Set the POWER switch to ON.

2362. Use VOM to measure VAC. Connect positive test lead to terminal (8), common test lead to terminal (7).

2363. Check that VOM indicates 5 VAC or less. If not, repair or replace wiring and connectors as necessary; go to step 2369.



2364. Set the POWER switch to OFF.

2365. Disconnect AC power from monitor.

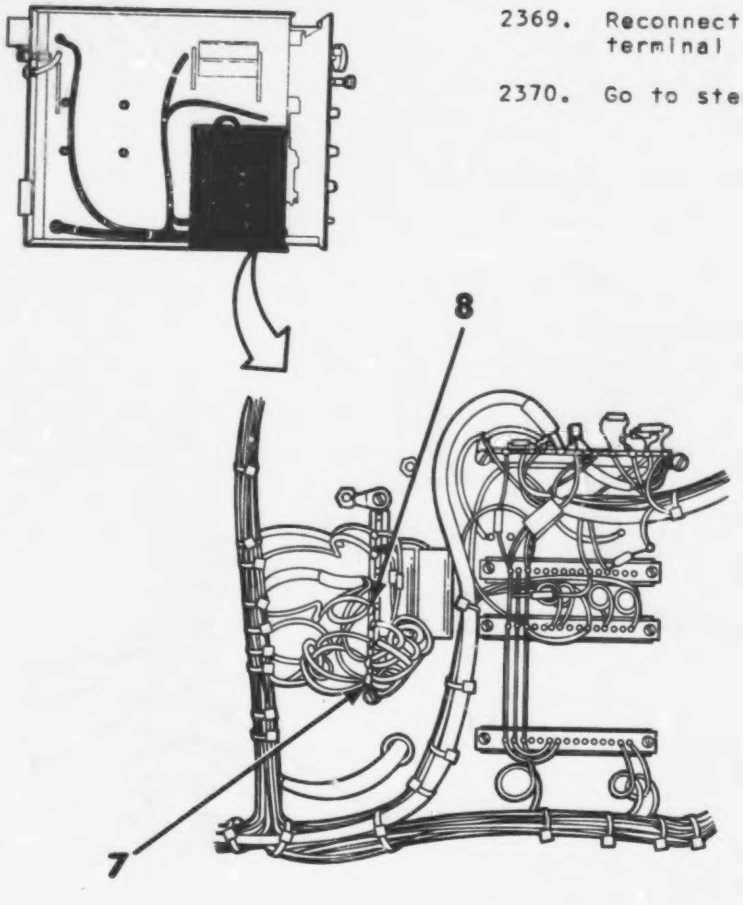
2366. Use VOM to measure OHMS. Connect positive test lead to switch terminal (2), common test lead to switch terminal (3).

2367. Check that VOM indicates 10K ohms or more. If not, replace MODE SELECTOR switch (5). Go to step 1.

2368. Replace triac (4). Go to step 1.

2369. Reconnect triac lead to terminal (6).

2370. Go to step 1.



2371. Check that 03 CONCENTRATION meter indicates between 6 and 10. If not, go to step 2374.

2372. Using CALIBRATE Adjust Micrometer, adjust meter for .07 and .09. If unable to adjust for between .07 and .09, go to step 2374.

2373. Go to step 59.

2374. Use VOM to measure VDC. Connect positive test lead to J1 pin 4 (7), common test lead to J3 pin 13 (8).

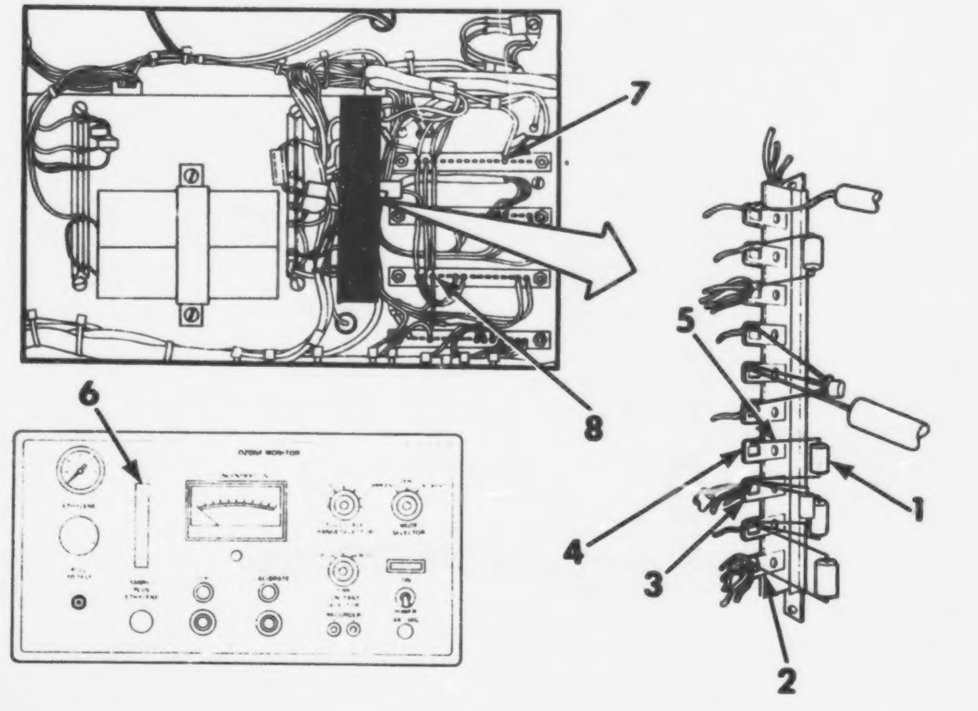
2375. Check that VOM indicates between 7 and 9 VDC. If not, go to step 2388.

2376. Set the POWER switch to OFF.

2377. Disconnect AC power from monitor.

2378. Use VOM to measure OHMS. Connect positive test lead to terminal (4), common test lead to meter terminal (9).

2379. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 1.



2380. Use VOM to measure OHMS. Connect positive test lead to terminal (2), common test lead to meter terminal (11).

2381. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 1.

2382. Disconnect resistor lead (5) from terminal.

2383. Use VOM to measure OHMS. Connect positive test lead to resistor lead (5), common test lead to terminal (3).

2384. Check that VOM indicates between .9 and 1.1M ohms. If not, replace resistor R4 (1). Go to step 1.

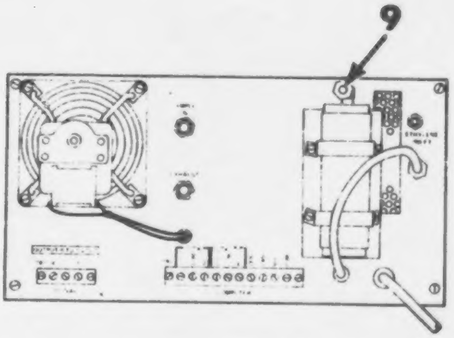
2385. Replace 03 CONCENTRATION meter (10).

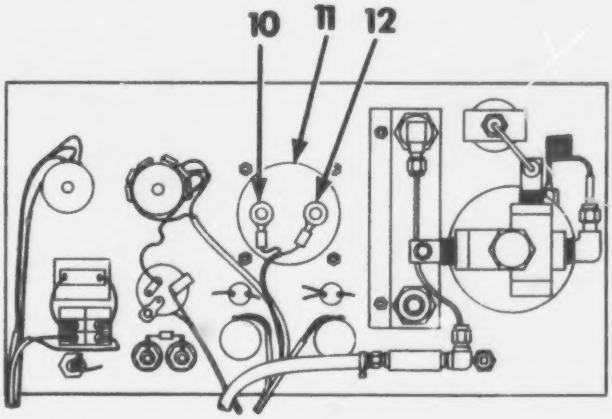
2386. Reconnect resistor lead to terminal (4).

2387. Go to step 1.

2388. Seal air inlet (8) and check that SAMPLE PLUS ETHYLENE flow gauge (6) indication remains steady. If not, go to step 2464.

2389. Clear air inlet (8).





2390. Use VOM to measure VDC. Connect positive test lead to J1 pin 13 (2), common test lead to J1 pin 14 (3).

2391. Check that VOM indicates between 105 and 115 VDC. If not, go to step 1591.

2392. Use VOM to measure VDC. Connect positive test lead to terminal (1), common test lead to J3 pin 13 (4).

2393. Check that VOM indicates between 50 and 85 VDC. If not, go to step 2399.

2394. Remove cover (10).

2395. Interchange Electrometer Amplifier PC Board (9) with a new one.

2396. Using CALIBRATE Adjust Micrometer, adjust meter for between .07 and .09. If unable to adjust for between .07 and .09, go to step 2406.

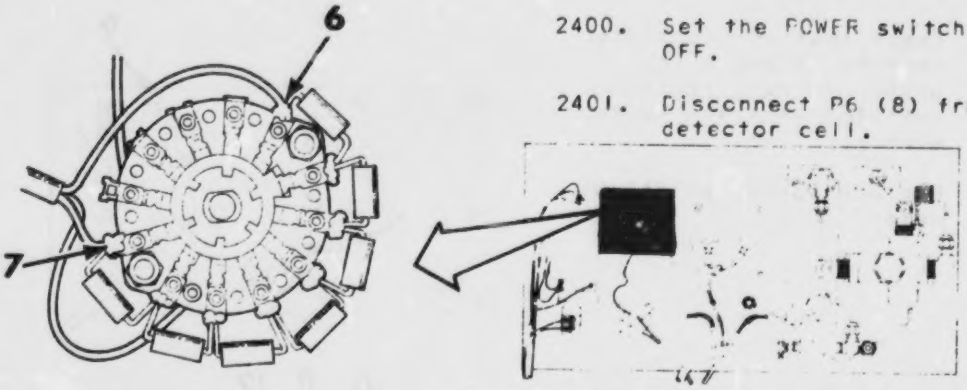
2397. Reinstall cover.

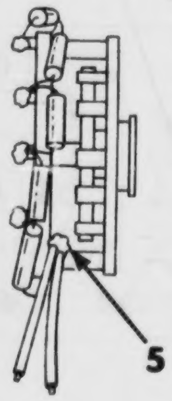
2398. Go to step 1.

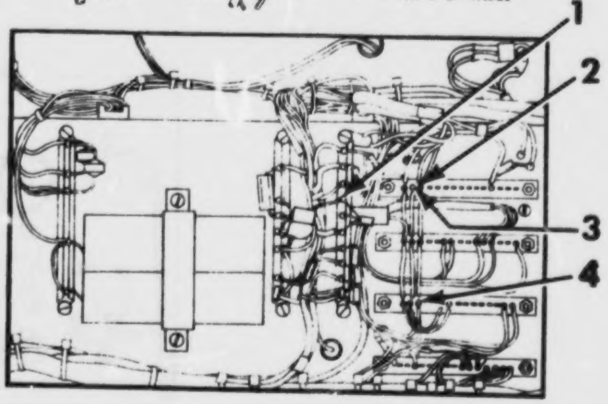
2399. Check that VOM indication was low. If not, go to step 2434.

2400. Set the POWER switch to OFF.

2401. Disconnect P6 (8) from detector cell.



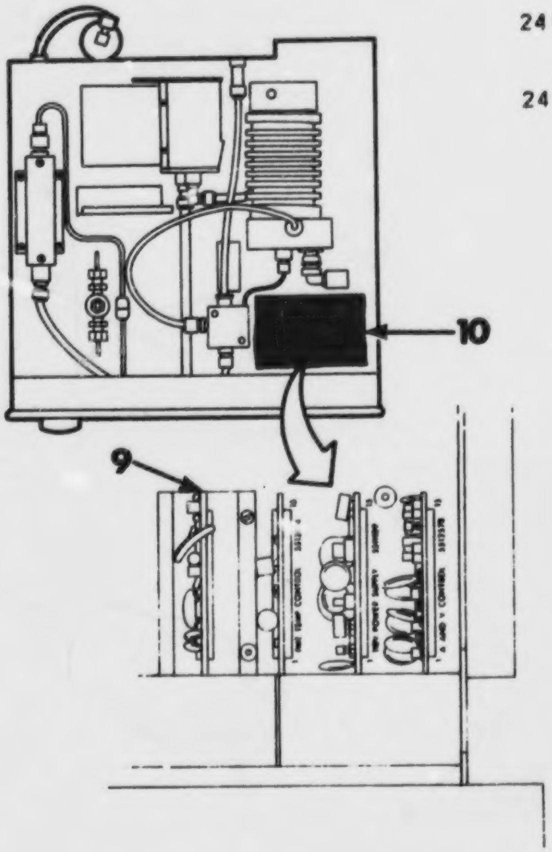




2402. Set the POWER switch to ON.

2403. Use VOM to measure VDC. Connect positive test lead to terminal (1), common test lead to J3 pin 13 (4).

2404. Check that VOM indicates between 50 and 85 VDC. If not, go to step 2440.



2405. Next, Replace Detector Cell Assembly, procedure begins at page 7-21 . Go on to step 1 when finished.

2406. Set the POWER switch to OFF.

2407. Disconnect AC power from monitor.

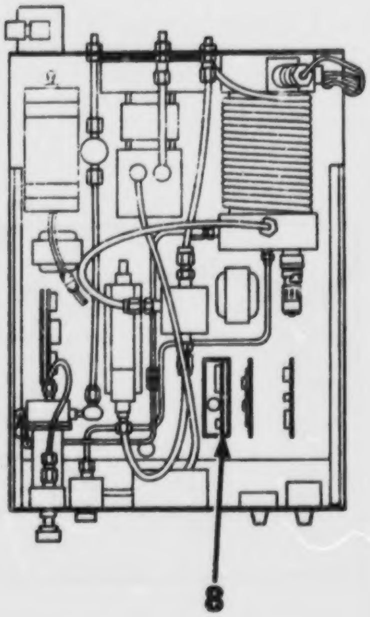
2408. Reinstall Electrometer Amplifier P.C. Board.

2409. Reinstall cover.

2410. Disconnect and tag lead (6).

2411. Disconnect and tag lead (7).

2412. Disconnect and tag lead (5).



2413. Use VOM to measure OHMS. Connect positive test lead to terminal (8), common test lead to terminal (9).

2414. Check that VOM indicates between 95 and 105K ohms. If not, go to step 2491.

2415. Use VOM to measure OHMS. Connect positive test lead to terminal (7), common test lead to terminal (8).

2416. Check that VOM indicates 5 ohms or less. If not, replace FULL SCALE RANGE SELECTOR (10). Go to step 1.

2417. Use VOM to measure OHMS. Connect positive test lead to terminal (7), common test lead to terminal (9).

2418. Check that VOM indicates between 95 and 105K ohms. If not, replace FULL SCALE RANGE SELECTOR (10). Go to step 1.

2419. Reconnect wire to terminal (8).

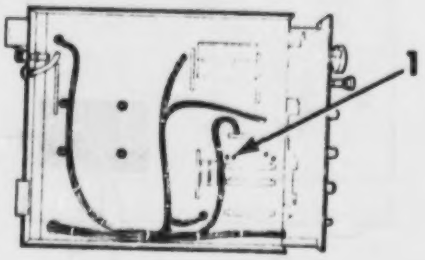
2420. Reconnect wire to terminal (9).

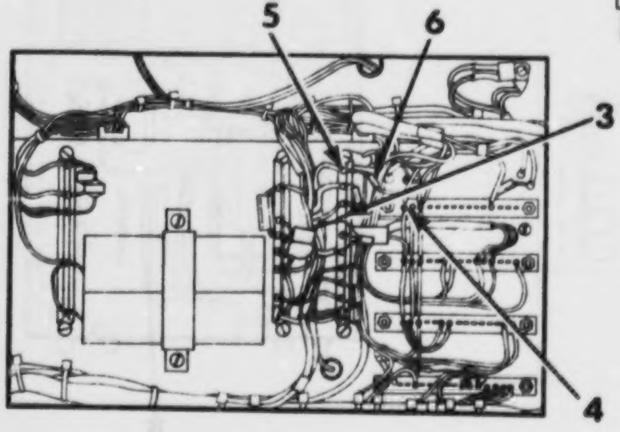
2421. Reconnect wire to terminal (7).

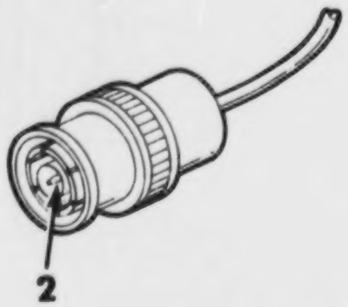
2422. Disconnect P7 (12) from detector cell.

2423. Use VOM to measure OHMS. Connect positive test lead to P7 center conductor (2), common test lead to connector (1).

2424. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2430.







2425. Reconnect P7 to detector cell.

2426. Disconnect P6 (12) from detector cell.

2427. Use VOM to measure OHMS. Connect positive test lead to P6 pin A (13), common test lead to terminal (3).

2428. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2432.

2429. Next, Replace Detector Cell Assembly, procedure begins at page 7-21 . Go on to step 1 when finished.

2430. Reconnect P7 to detector cell.

2431. Go to step 1.

2432. Reconnect P6 to detector cell.

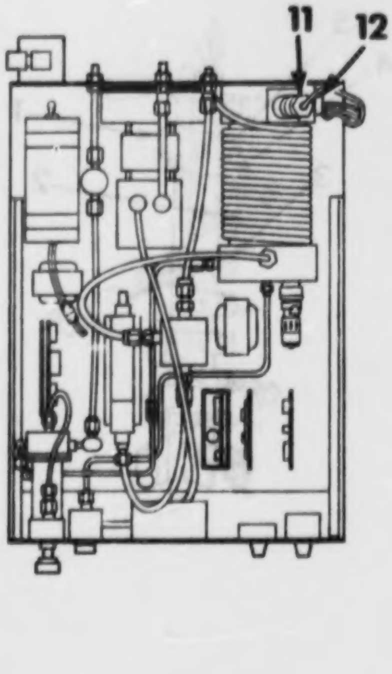
2433. Go to step 1.

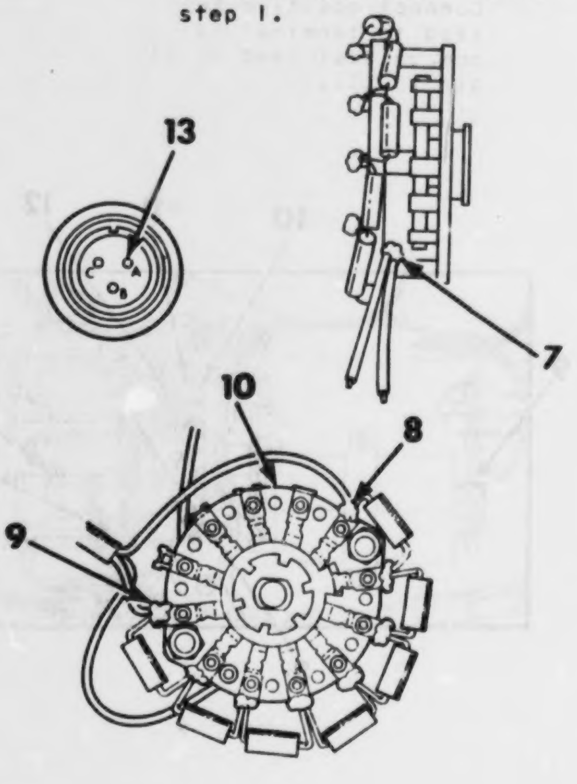
2434. Set the POWER switch to OFF.

2435. Disconnect AC power from monitor.

2436. Use VOM to measure OHMS. Connect positive test lead to J1 pin 15 (4), common test lead to terminal (5).

2437. Check that VOM indicates between 2.5 and 3K ohms. If not, replace resistor R16 (6). Go to step 1.





2437.5 Connect AC power to monitor.

2438. Set the POWER switch to ON.

2439. Go to step 2443.

2440. Use VOM to measure VDC. Connect positive test lead to terminal (3), common test lead to J3 pin 13 (7).

2441. Check that VOM indicates between 95 and 105 VDC. If not, go to step 2446.

2442. Reconnect P6 to detector cell.

2443. Use VOM to measure VDC. Connect positive test lead to terminal (2), common test lead to J3 pin 13 (7).

2444. While observing VOM, rotate CALIBRATE Adjust Micrometer fully clockwise and counterclockwise. Check that VOM indication varies between 55 and 80 VDC. If not, go to step 2449.

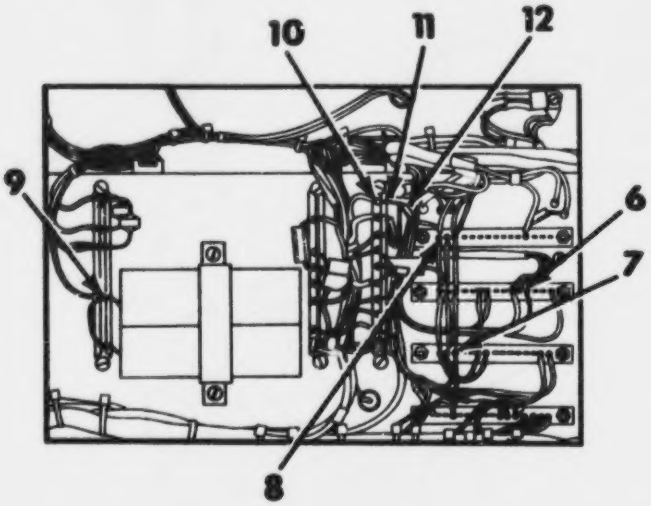
2445. Replace transistor Q1 (6). Go to step 1.

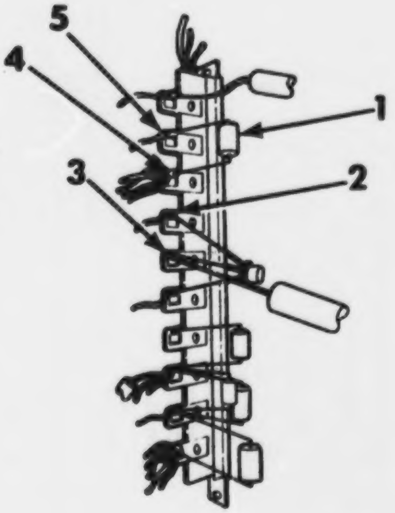
2446. Replace resistor R16 (9).

2447. Reconnect P6 to detector cell.

2448. Go to step 1.

2449. Use VOM to measure VDC. Connect positive test lead to R14 terminal (13), common test lead to J3 pin 13 (7).





2450. While observing VOM, rotate CALIBRATE Adjust Micrometer fully clockwise and counterclockwise. Check that VOM indication varies between 55 and 80 VDC. If not, go to step 2452.

2451. Repair or replace wiring and connectors as necessary. Go to step 1.

2452. Set the POWER switch to OFF.

2453. Disconnect AC power from monitor.

2454. Disconnect resistor lead (11) from terminal.

2455. Use VOM to measure OHMS. Connect positive test lead to resistor lead (11), common test lead to J1 pin 15 (8).

2456. Check that VOM indicates between .9 and 1.1K ohms. If not, replace resistor R15 (12). Go to step 1.

2457. Use VOM to measure OHMS. Connect positive test lead to R14 terminal (16), common test lead to R14 terminal (14).

2458. Check that VOM indicates between 18 and 22K ohms. If not, replace Potentiometer R14 (15). Go to step 2462.

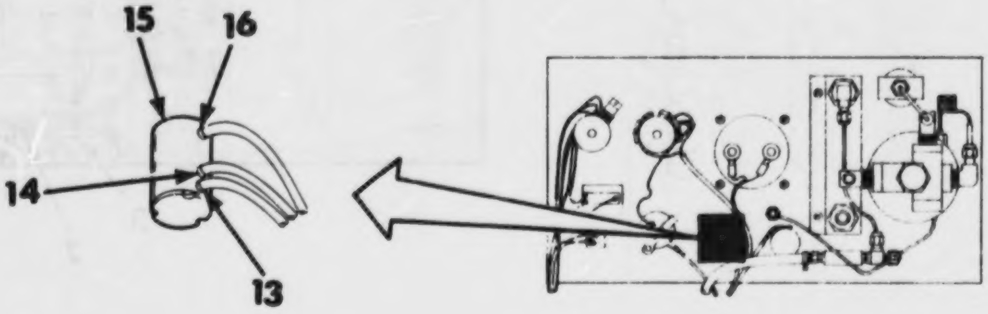
2459. Use VOM to measure OHMS. Connect positive test lead to terminal (5), common test lead to terminal (4).

2460. Check that VOM indicates between 28 and 32K ohms. If not, replace resistor R13 (1). Go to step 2462.

2461. Repair or replace wiring and connectors as necessary.

2462. Reconnect resistor lead to terminal (10).

2463. Go to step 1.



2464. Use VOM to measure VDC. Connect positive test lead to J4 pin 3 (1), common test lead to terminal (5).

2465. Check that VOM indicates 5 VAC or less. If not, go to step 2467.

2466. Replace Selector Solenoid Valve (7). Go to step 1.

2467. Use VOM to measure VDC. Connect positive test lead to J4 pin 6 (2), common test lead to J4 pin 13 (3).

2468. Check that VOM indicates .5 VDC or less. If not, go to step 2474.

2469. Remove cover (6).

2470. Remove Alarm and Valve Control P.C. Board (4).

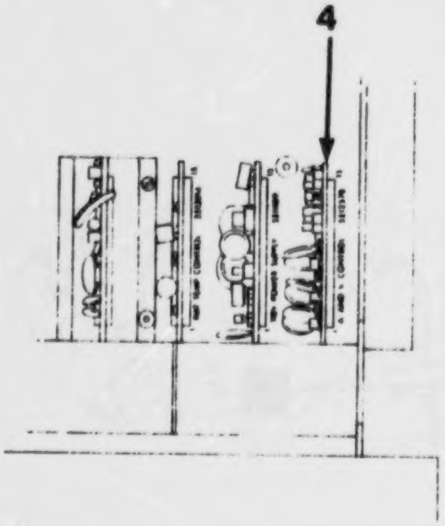
2471. Use VOM to measure VAC. Connect positive test lead to J4 pin 3 (1), common test lead to terminal (5).

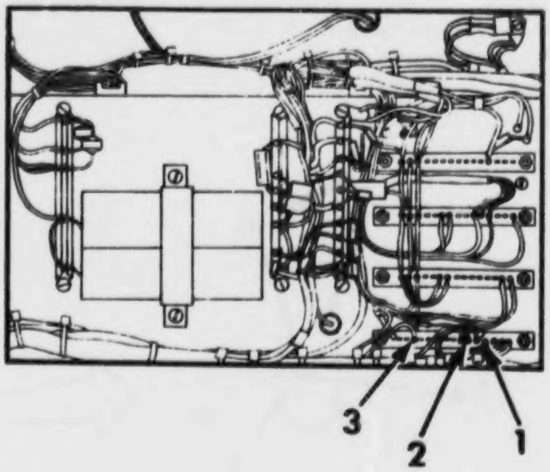
2472. Check that VOM indicates 5 VAC or less. If not, repair or replace wiring and connectors as necessary; go to step 2479.

2473. Go to step 2478.

2474. Remove cover (6).

2475. Remove Alarm and Valve Control P.C. Board (4).





2476. Use VOM to measure VDC. Connect positive test lead to J4 pin 6 (2), common test lead to J4 pin 13 (3).

2477. Check that VOM indicates .5 VDC or less. If not, repair or replace wiring and connectors as necessary; go to step 2479.

2478. Replace Alarm and Valve Control P.C. Board (4). Go to step 2480.

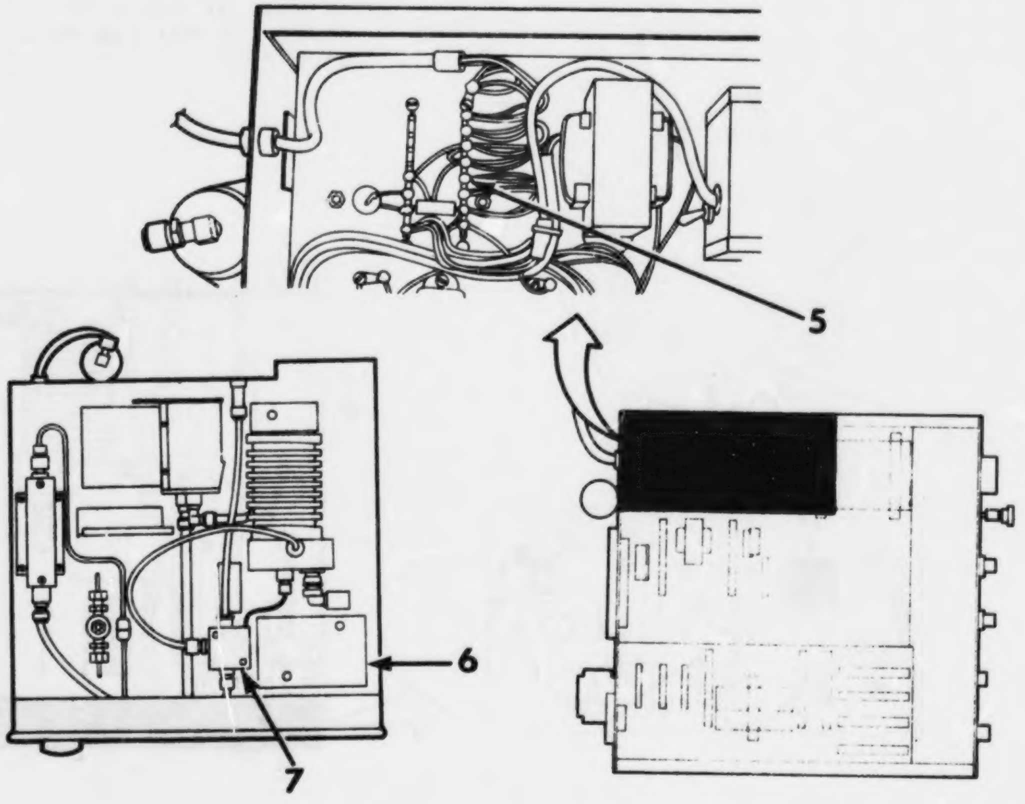
2479. Reinstall Alarm and Valve Control P.C. Board.

2480. Reinstall cover.

2481. Go to step .

2482. Set the POWER switch to OFF.

2483. Disconnect AC power from monitor.



2484. Check that FULL SCALE RANGE SELECTOR switch (4) has no physical damage. If damaged, repair or replace FULL SCALE RANGE SELECTOR switch (4). Go to step 2515.

2486. Disconnect and tag lead (5).

2487. Disconnect and tag lead (3).

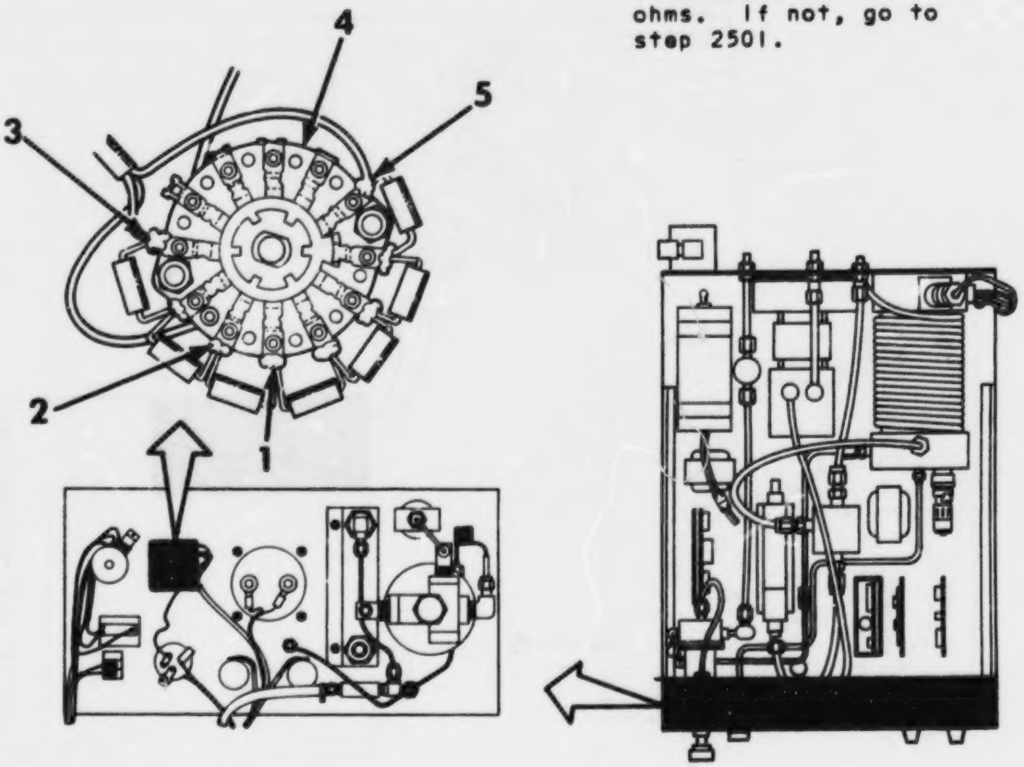
2488. Use VOM to measure OHMS. Connect positive test lead to resistor lead (5), common test lead to resistor lead (3).

2489. Check that VOM indicates between 95 and 105K ohms. If not, go to step 2491.

2490. Replace FULL SCALE RANGE SELECTOR switch (4). Go to step 2515.

2491. Use VOM to measure OHMS. Connect positive test lead to resistor lead (5), common test lead to resistor lead (1).

2492. Check that VOM indicates between 90 and 110K ohms. If not, go to step 2501.



2493. Use VOM to measure OHMS. Connect positive test lead to resistor lead (1), common test lead to resistor lead (2).

2494. Check that VOM indicates between 2.8 and 3.1 K ohms. If not, go to step 2517.

2495. Use VOM to measure OHMS. Connect positive test lead to resistor lead (2), common test lead to resistor lead (8).

2496. Check that VOM indicates between 950 ohms and 1.1K ohms. If not, go to step 2521.

2497. Disconnect resistor lead (10) from switch terminal.

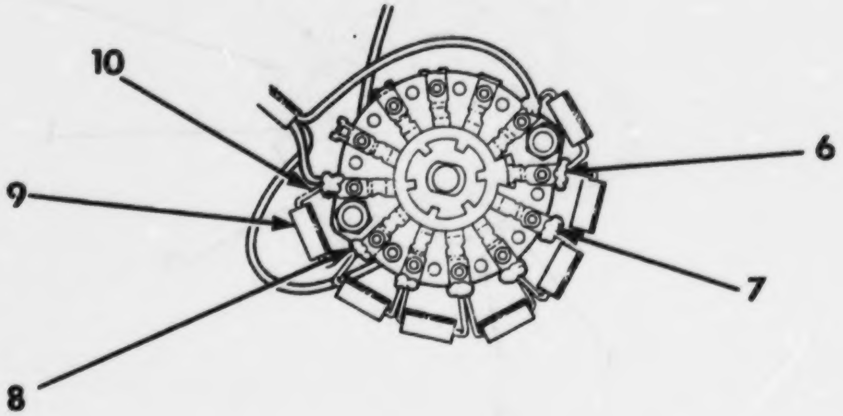
2498. Use VOM to measure OHMS. Connect positive test lead to resistor lead (8), common test lead to resistor lead (10).

2499. Check that VOM indicates between 950 ohms and 1.1K ohms. If not, replace R11 (9). Go to step 2515.

2500. Replace Full Scale Range Selector Switch (4). Go to step 2515.

2501. Use VOM to measure OHMS. Connect positive test lead to resistor lead (1), common test lead to resistor lead (7).

2502. Check that VOM indicates between 14.5 and 16K ohms. If not, go to step 2509.



2503. Use VOM to measure OHMS. Connect positive test lead to resistor lead (2), common test lead to resistor lead (1).

2504. Check that VOM indicates between 28.5 and 31.5K ohms. If not, go to step 2525.

2505. Disconnect resistor lead (8) from switch terminal.

2506. Use VOM to measure OHMS. Connect positive test lead to resistor lead (6), common test lead to resistor lead (8).

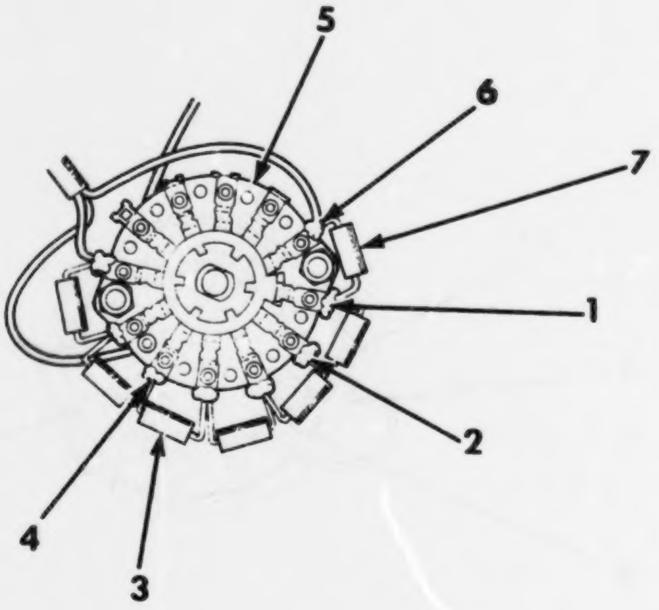
2507. Check that VOM indicates between 49K and 51K ohms. If not, replace R5 (7). Go to step 2515.

2508. Replace Full Scale Range Selector Switch (5). Go to step 2515.

2509. Use VOM to measure OHMS. Connect positive test lead to resistor lead (2), common test lead to resistor lead (9).

2510. Check that VOM indicates between 9.5 and 10.5K ohms. If not, go to step 2529.

2511. Disconnect resistor lead (11) from switch terminal.



2512. Use VOM to measure OHMS. Connect positive test lead to resistor lead (9), common test lead to resistor lead (0).

2513. Check that VOM indicates between 4.5K and 5.5K ohms. If not, replace R8 (10). Go to step 2515.

2514. Replace Full Scale Range Selector Switch (5). Go to step 2515.

2515. Reconnect tagged leads.

2516. Go to step 1.

2517. Disconnect resistor lead (12) from switch terminal.

2518. Use VOM to measure OHMS. Connect positive test lead to resistor lead (4), common test lead to resistor lead (12).

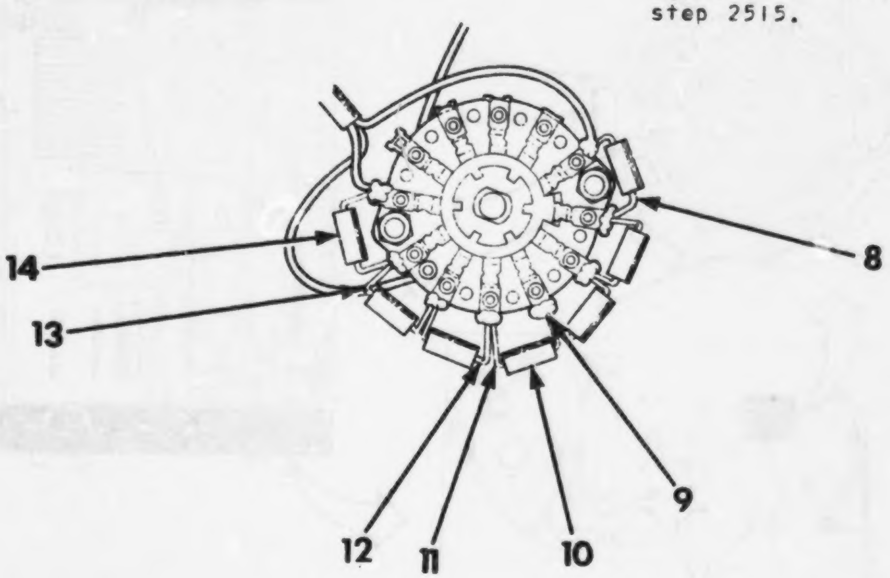
2519. Check that VOM indicates between 2.8K and 3.1K ohms. If not, replace R9 (3). Go to step 2515.

2520. Replace Full Scale Range Selector Switch (5). Go to step 2515.

2521. Disconnect resistor lead (13) from switch terminal.

2522. Use VOM to measure OHMS. Connect positive test lead to resistor lead (4), common test lead to resistor lead (13).

2523. Check that VOM indicates between 950 ohms and 1.1K ohms. If not, replace R10 (14). Go to step 2515.



2524. Replace Full Scale Range Selector Switch (4). Go to step 2515.

2525. Disconnect resistor lead (5) from switch terminal.

2526. Use VOM to measure OHMS. Connect positive test lead to resistor lead (1), common test lead to resistor lead (5).

2527. Check that VOM indicates between 28.5 and 31.5K ohms. If not, replace R6 (6). Go to step 2515.

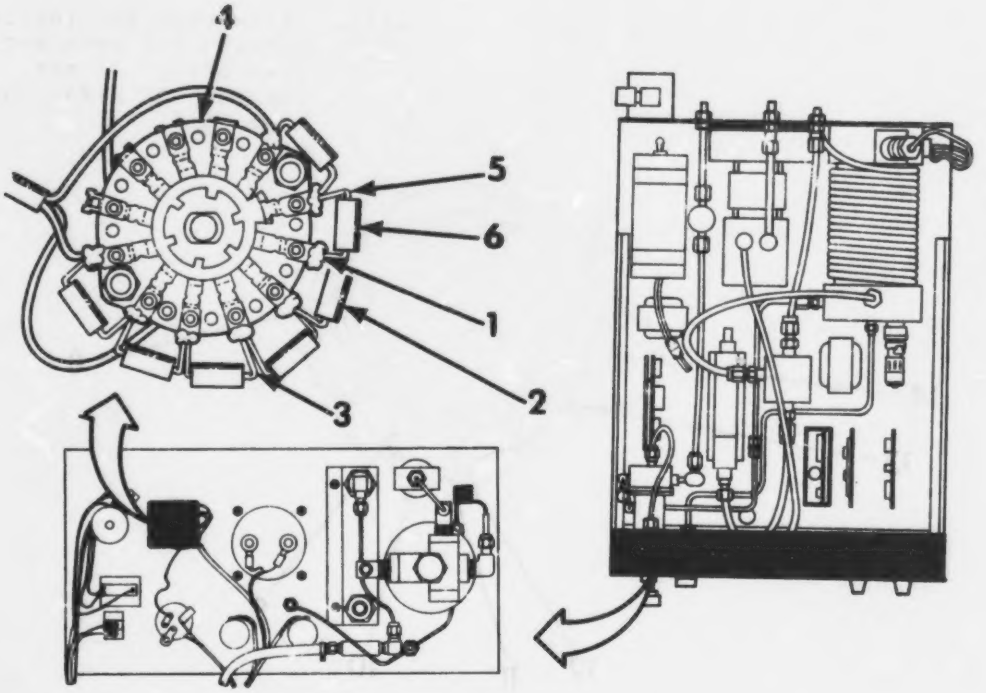
2528. Replace Full Scale Range Selector Switch (4). Go to step 2515.

2529. Disconnect resistor lead (3) from switch terminal.

2530. Use VOM to measure OHMS. Connect positive test lead to resistor lead (1), common test lead to resistor lead (3).

2531. Check that VOM indicates between 9.5 and 10.5K ohms. If not, replace R7 (2). Go to step 2515.

2532. Replace Full Scale Range Selector Switch (4). Go to step 2515.



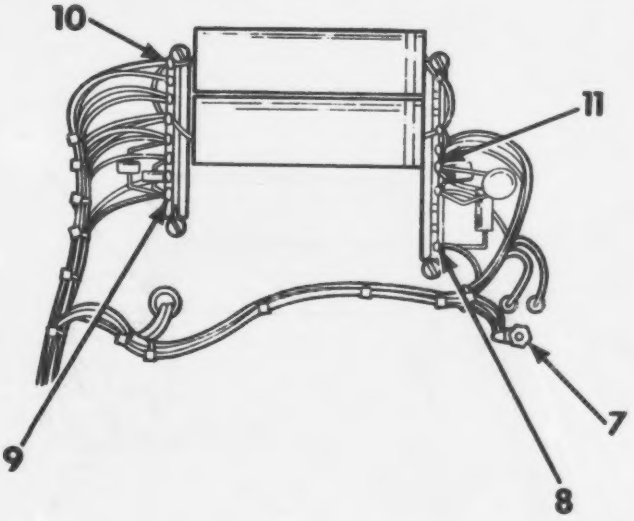
2533. Check that voltage was low. If high, go to step 2545.

2534. Use VOM to measure VDC. Connect positive test lead to terminal (9), common test lead to terminal (10).

2535. Check that VOM indicates 4 VDC or more. If not, go to step 2554.

2536. Use VOM to measure VDC. Connect positive test lead to terminal (11), common test lead to terminal (8).

2537. Check that VOM indicates between .25 and 1.0 VDC. If not, go to step 2572.



2538. Set the POWER switch to OFF.

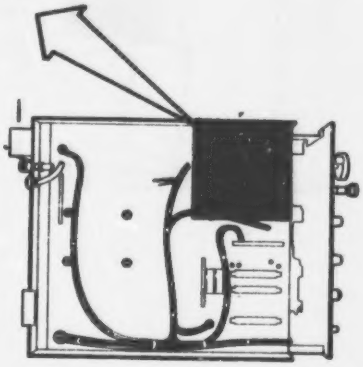
2539. Disconnect AC power from monitor.

2540. Use VOM to measure OHMS. Connect positive test lead to CR3 lead (9), common test lead to Q2 collector (7).

2541. Check that VOM indicates between .75 and 1.25 ohms. If not, go to step 2595.

2542. Use VOM to measure OHMS. Connect positive test lead to Q2 collector (4), common test lead to ground.

2543. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 1.



2544. Disconnect wire (10) from terminal.

2545. Disconnect two wires (11) from terminal.

2546. Use VOM to measure OHMS. Connect positive test lead to CR3 anode (8), common test lead to CR3 cathode (3).

2547. Check that VOM indicates 25 ohms or less. If not, replace diode CR3 (9). Go to step 2623.

2548. Use VOM to measure OHMS. Connect positive test lead to CR3 cathode (3), common test lead to CR3 anode (8).

2549. Check that VOM indicates 100K ohms or more. If not, replace diode CR3 (9). Go to step 2623.

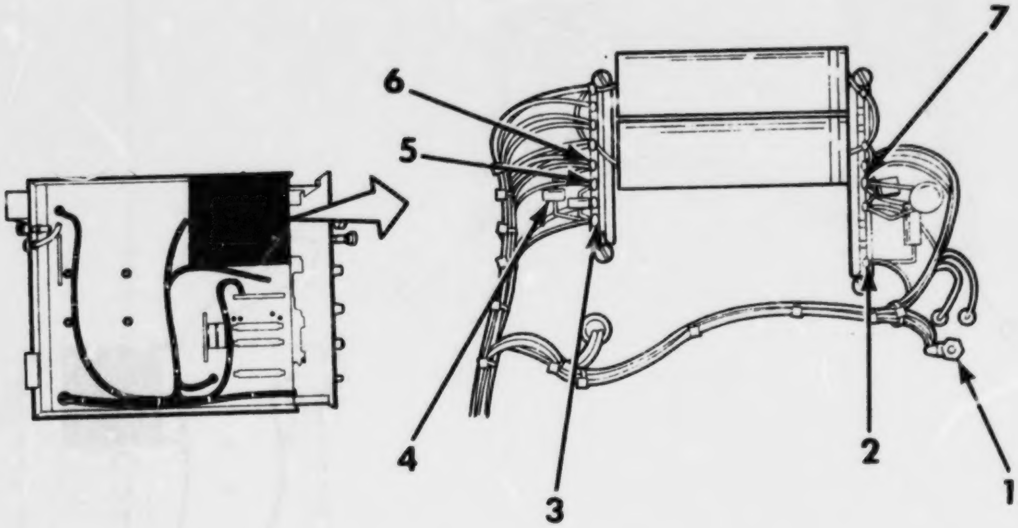
2550. Use VOM to measure OHMS. Connect positive test lead to CR4 anode (12), common test lead to CR4 cathode (3).

2551. Check that VOM indicates 25 ohms or less. If not, replace diode CR4 (4). Go to step 2623.

2552. Use VOM to measure OHMS. Connect positive test lead to CR4 cathode (3), common test lead to CR4 anode (12).

2553. Check that VOM indicates 100K ohms or more. If not, replace diode CR4 (4). Go to step 2623.

2554. Disconnect two wires (13) from terminal.



2555. Replace transistor Q2 (14). Go to step 1.

2556. Use VOM to measure VDC. Connect positive test lead to terminal (7), common test lead to terminal (2).

2557. Check that VOM indicates 2.0 VDC or less. If not, go to step 2602.

2558. Set the POWER switch to OFF.

2559. Disconnect AC power from monitor.

2560. Use VOM to measure OHMS. Connect positive test lead to terminal (7), common test lead to terminal (2).

2561. Check that VOM indicates 18 ohms or more. If not, go to step 2608.

2562. Use VOM to measure OHMS. Connect positive test lead to CR3 cathode (3), common test lead to Q2 collector (1).

2563. Check that VOM indicates between .75 and 1.25 ohms. If not, go to step 2614.

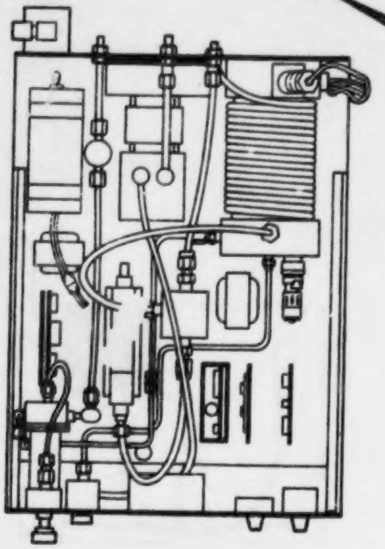
2564. Replace transistor Q2 (14). Go to step 1.

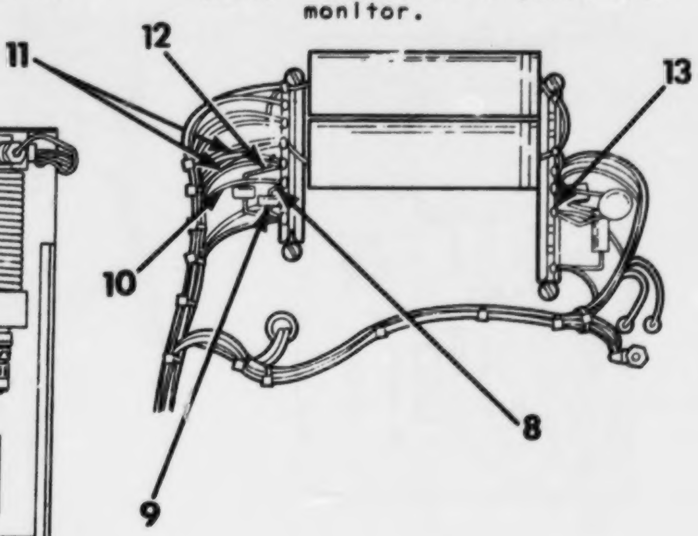
2565. Use VOM to measure VAC. Connect positive test lead to terminal (5), common test lead to terminal (6).

2566. Check that VOM indicates 10 VAC or more. If not, go to step 2678.

2567. Set the POWER switch to OFF.

2568. Disconnect AC power from monitor.





NOTE

In the next steps VOM indication must be observed the instant VOM test leads are connected.

2569. Use VOM to measure OHMS. Connect positive test lead to terminal (1), common test lead to terminal (2) and check that VOM indication initially deflects to 50 ohms or less then increases to 100K ohms or more. If not, go to step 2620.

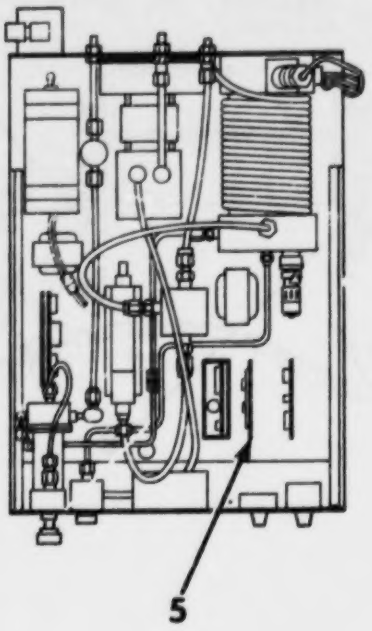
NOTE

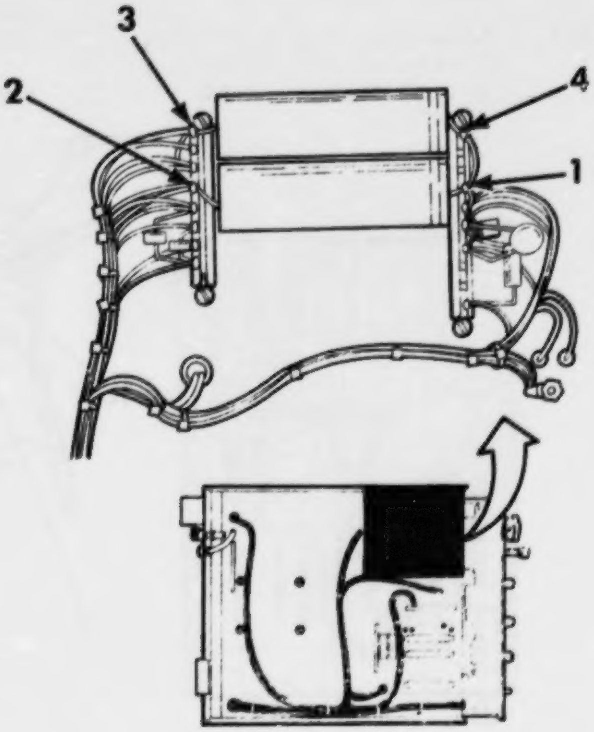
In the next steps VOM indication must be observed, the instant VOM test leads are connected.

2570. Use VOM to measure OHMS. Connect positive test lead to terminal (4), common test lead to terminal (3) and check that VOM indication initially deflects to 50 ohms or less then increases to 100K ohms or more. If not, go to step 2621.

2571. Repair or replace wiring and connectors as necessary. Go to step 2622.

2572. Interchange Photomultiplier Temperature Control PC Board (5) with a new one.





NOTE

To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 22. If malfunction symptom still persists, go to step 2573. If malfunction is cleared, continue with checkout.

2573. Remove Photomultiplier Temperature Control P.C. Board.

2574. Use VOM to measure VAC. Connect positive test lead to J2 pin 1 (6), common test lead to J2 pin 4 (7).

2575. Check that VOM indicates 6 VAC or more. If not, repair or replace wiring and connectors as necessary; go to step 2661.

2576. Set the POWER switch to OFF.

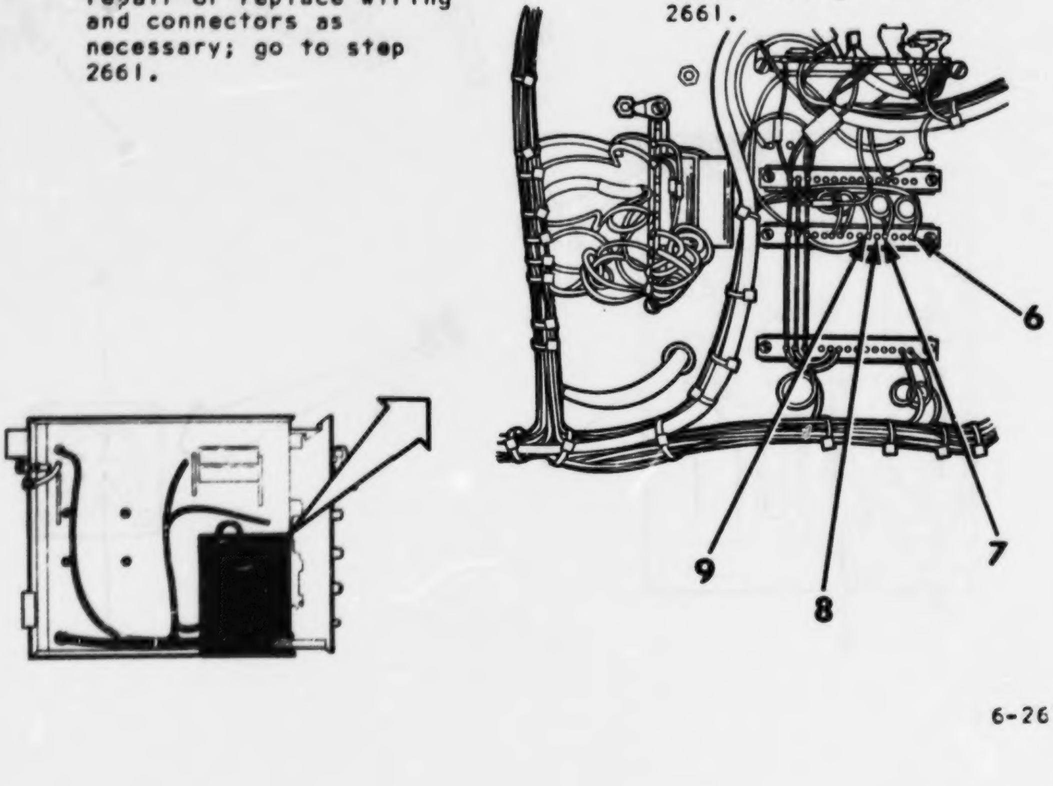
2577. Disconnect AC power from monitor.

2578. Use VOM to measure OHMS. Connect positive test lead to J2 pin 4 (7), common test lead to J2 pin 5 (8).

2579. Check that VOM indicates 3.5K ohms or less. If not, go to step 2626.

2580. Use VOM to measure OHMS. Connect positive test lead to J2 pin 6 (9), common test lead to ground.

2581. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2661.



2582. Use VOM to measure OHMS. Connect positive test lead to Q2 emitter (2), common test lead to terminal (3).

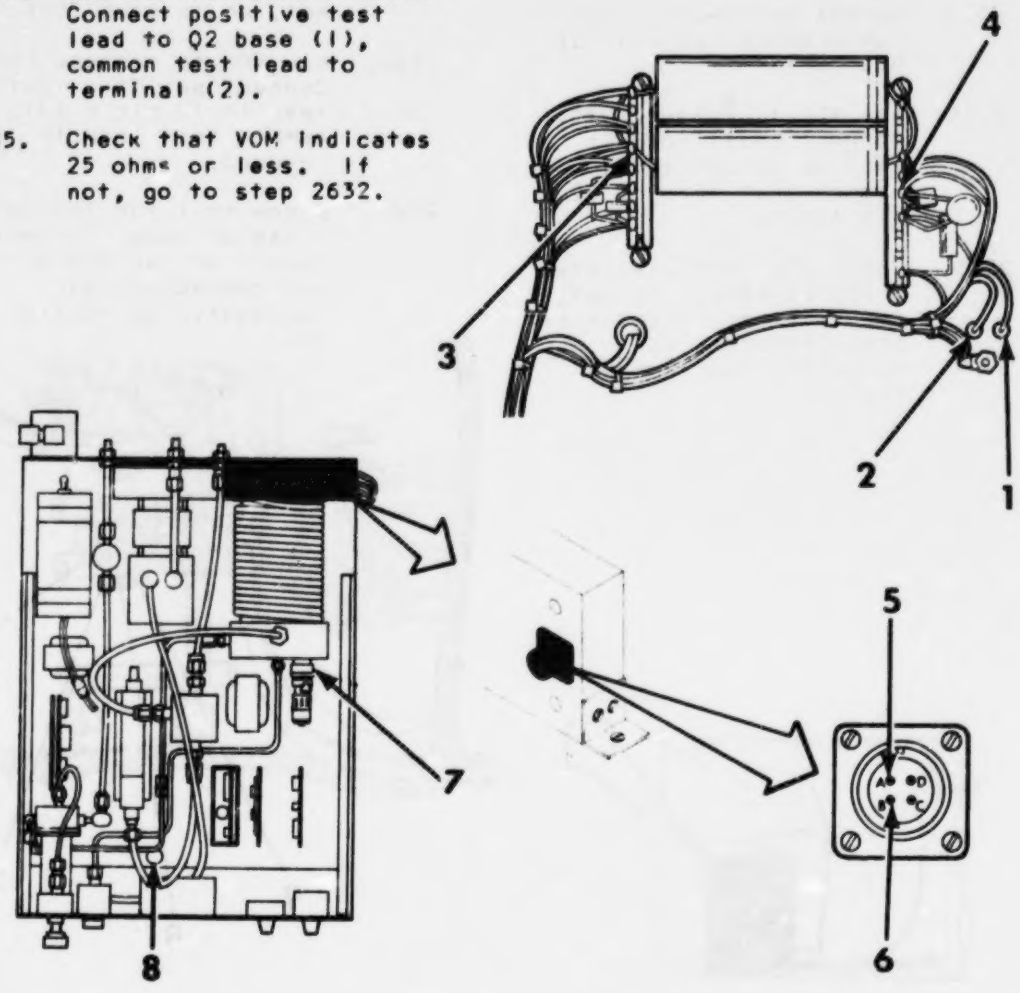
2583. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2661.

2584. Use VOM to measure OHMS. Connect positive test lead to Q2 base (1), common test lead to terminal (2).

2585. Check that VOM indicates 25 ohms or less. If not, go to step 2632.

2586. Use VOM to measure OHMS. Connect positive test lead to Q2 base (1), common test lead to Q2 emitter (2).

2587. Check that VOM indicates 1K ohms or less. If not, replace transistor Q2 (8). Go to step 2661.



2588. Use VOM to measure OHMS. Connect positive test lead to J2 pin 4 (9), common test lead to Q3 collector (4).

2589. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2661.

2590. Use VOM to measure OHMS. Connect positive test lead to J2 pin 9 (10), common test lead to Q3 base (13).

2591. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2661.

2592. Use VOM to measure OHMS. Connect positive test lead to J2 pin 10 (11), common test lead to Q3 emitter (14).

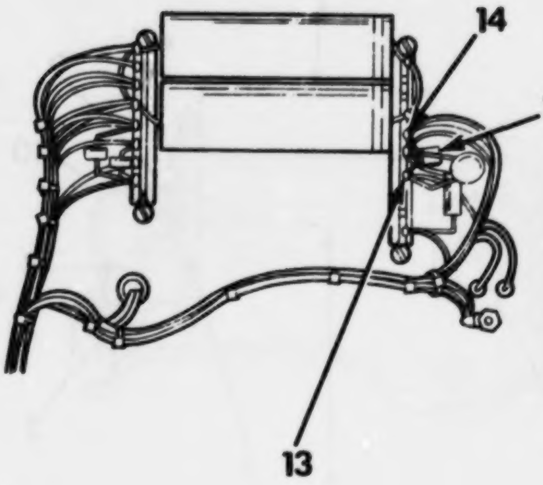
2593. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2661.

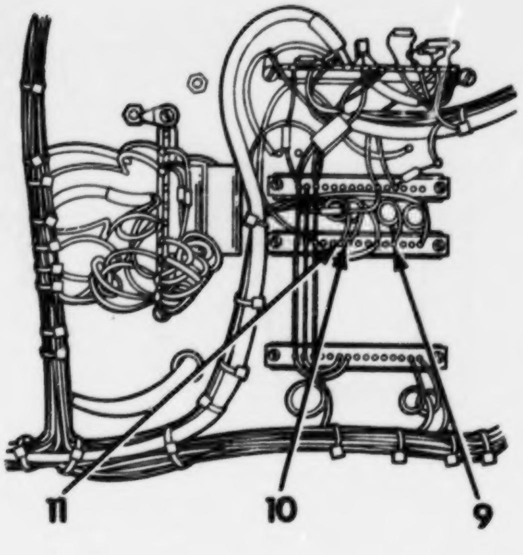
2594. Replace transistor Q3 (9). Go to step 2661.

2595. Disconnect P8 (7) from detector cell.

2596. Use VOM to measure OHMS. Connect positive test lead to J8 pin A (5), common test lead to J8 pin B (6).

2597. Check that VOM indicates between 1.0 and 2.0 ohms. If not, go to step 2601.





2598. Repair or replace wiring and connectors as necessary.

2599. Reconnect P8 to detector cell.

2600. Go to step 1.

2601. Next, Replace Detector Cell Assembly procedure begins at page 7-21. Go on to step 1 when finished.

2602. Use VOM to measure VDC. Connect positive test lead to terminal (3), common test lead to terminal (9).

2603. Check that VOM indicates .7 VDC or less. If not, go to step 2635.

2604. Set the POWER switch to OFF.

2605. Disconnect AC power from monitor.

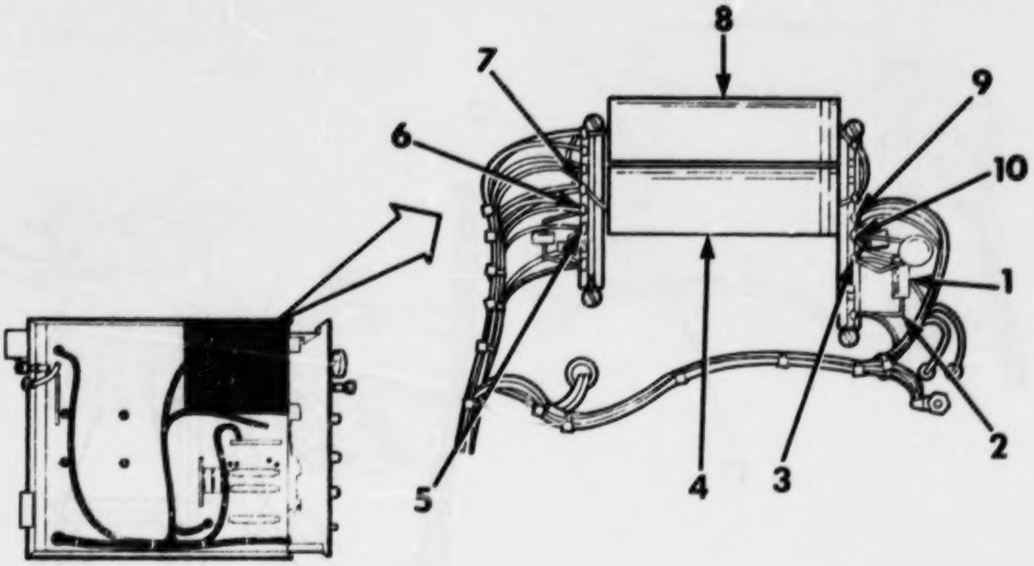
2606. Remove Photomultiplier Temperature Control P.C. Board (14).

2607. Go to step 2650.

2608. Disconnect R19 lead (2) from terminal.

2609. Use VOM to measure OHMS. Connect positive test lead to R19 lead (2), common test lead to terminal (10).

2610. Check that VOM indicates 18 ohms or more. If not, replace Resistor R19 (1). Go to step 1.



2611. Repair or replace wiring and connectors as necessary.

2612. Reconnect R19 lead to terminal.

2613. Go to step 1.

2614. Disconnect P8 (13) from detector cell.

2615. Use VOM to measure OHMS. Connect positive test lead to J8 pin A (11), common test lead to J8 pin B (12).

2616. Check that VOM indicates between 1 and 2 ohms. If not, go to step 2601.

2617. Repair or replace wiring and connectors as necessary.

2618. Reconnect P8 to detector cell.

2619. Go to step 1.

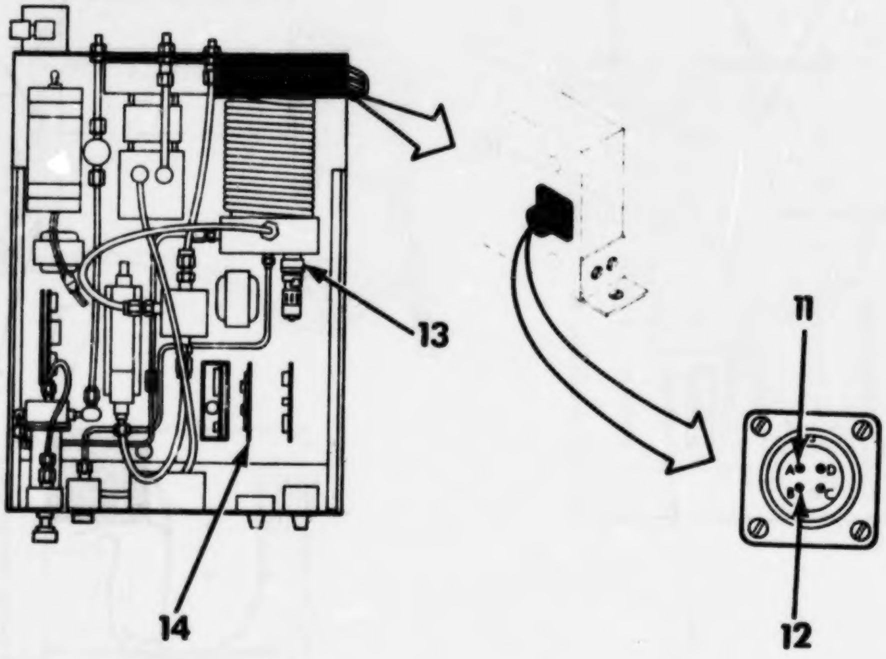
2620. Replace capacitor C8 (4). Go to step 2622.

2621. Replace capacitor C9 (8).

2622. Reconnect two wires to terminal (7).

2623. Reconnect wire to terminal (5).

2624. Reconnect two wires to terminal (6).



2625. Go to step 1.

2626. Disconnect P6 (8) from detector cell.

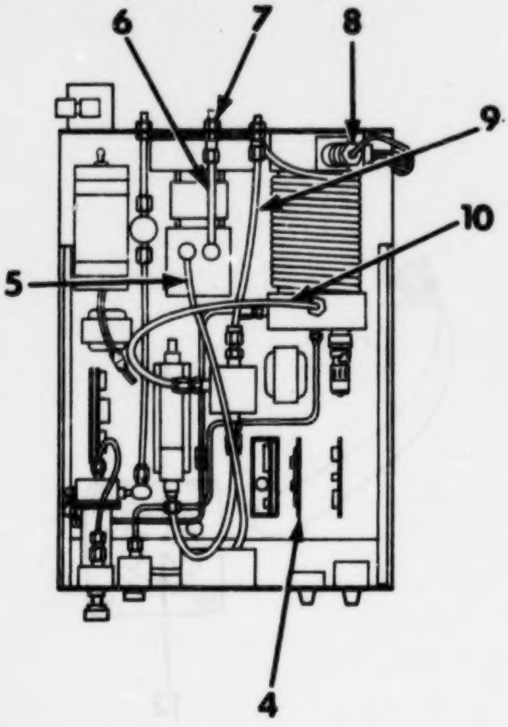
2627. Use VOM to measure OHMS. Connect positive test lead to J6 pin B (7), common test lead to J6 pin C (5).

2628. Check that VOM indicates 3.5K ohms or less. If not, go to step 2660.

2629. Repair or replace wiring and connectors as necessary.

2630. Reconnect P6 to detector cell.

2631. Go to step 2661.



2632. Use VOM to measure OHMS. Connect positive test lead to terminal (3), common test lead to terminal (2).

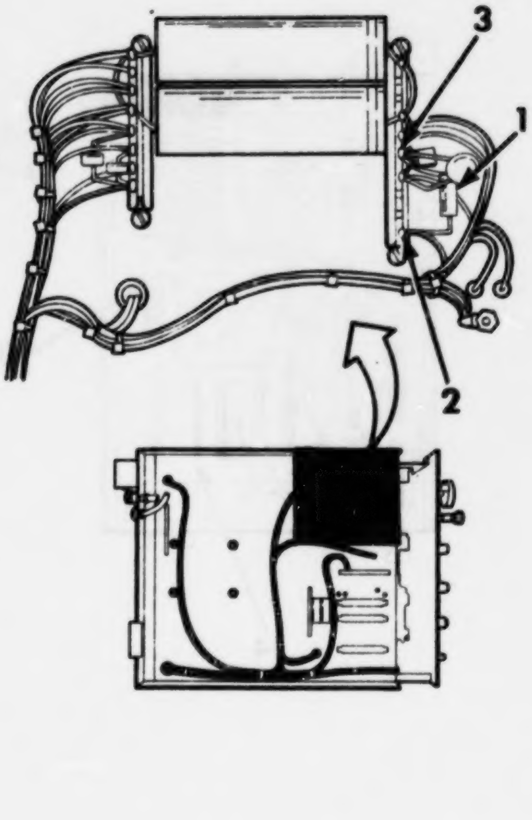
2633. Check that VOM indicates 25 ohms or less. If not, replace resistor R19 (1). Go to step 2661.

2634. Repair or replace wiring and connectors as necessary. Go to step 2661.

2635. Set the POWER switch to OFF.

2636. Disconnect AC power from monitor.

2637. Disconnect P6 (8) from detector cell.



2638. Use VOM to measure OHMS. Connect positive test lead to J6 pin B (7), common test lead to J6 pin C (6).

2639. Check that VOM indicates 1.8K ohms or more. If not, go to step 2601.

2640. Remove Photomultiplier Temperature Control P.C. Board (4).

2641. Use VOM to measure OHMS. Connect positive test lead to P6 pin B (10), common test lead to J2 pin 4 (11).

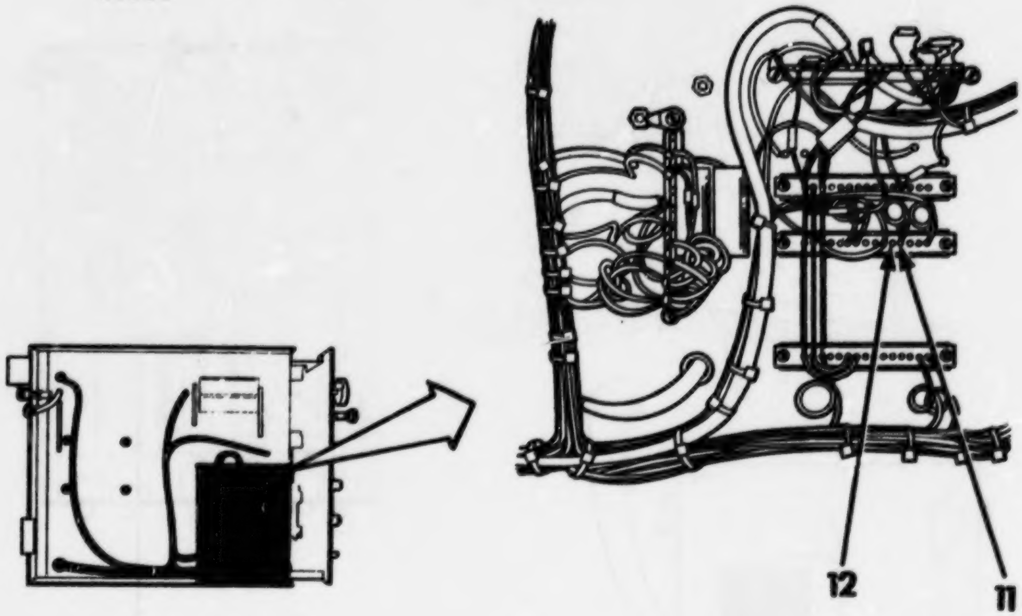
2642. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2663.

2643. Use VOM to measure OHMS. Connect positive test lead to P6 pin C (9), common test lead to J2 pin 5 (12).

2644. Check that VOM indicates 1 ohm or less. If not, repair or replace wiring and connectors as necessary; go to step 2663.

2645. Reconnect P6 to detector cell.

2646. Install new Photomultiplier Temperature Control PC Board.



NOTE

To determine if card substitution cleared malfunction, perform checkout beginning with step 17 and continuing through step 22. If malfunction symptom still persists, go to step 2647. If malfunction is cleared, continue with checkout.

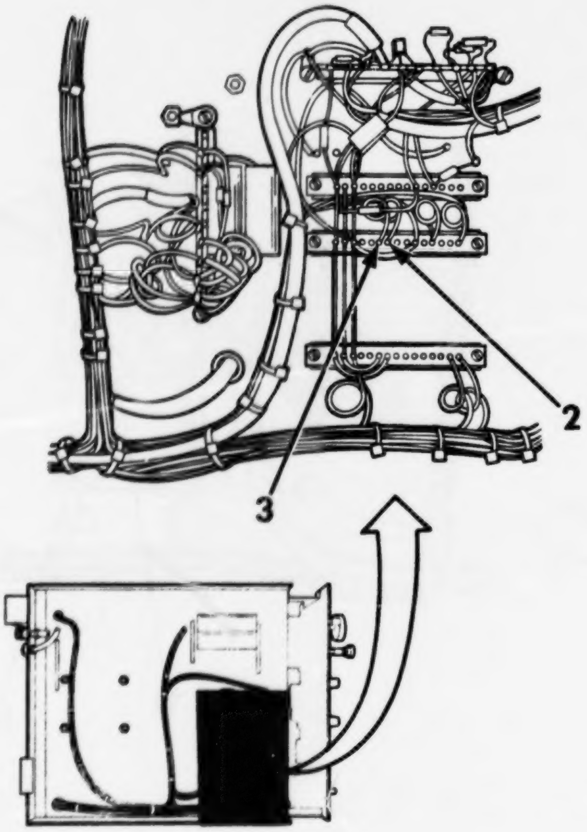
2647. Set the POWER switch to OFF.

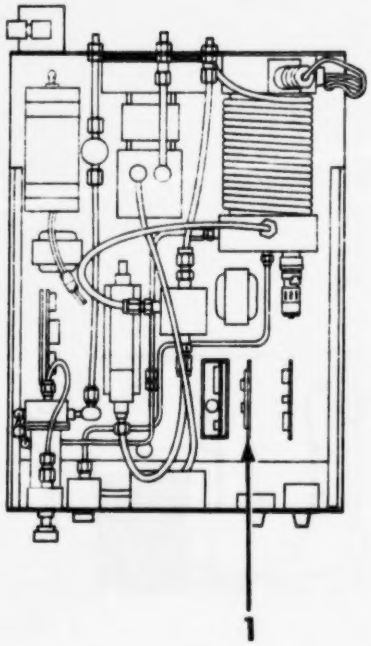
2648. Disconnect AC power from monitor.

2649. Remove new Photomultiplier Temperature Control P.C. Board (1).

2650. Use VOM to measure OHMS. Connect positive test lead to J2 pin 9 (2), common test lead to J2 pin 10 (3).

2651. Check that VOM indicates 500K ohms or more. If not, go to step 2666.





2652. Use VOM to measure OHMS. Connect positive test lead to terminal (8), common test lead to terminal (7).

2653. Check that VOM indicates 100K ohms or more. If not, replace transistor Q3 (9). Go to step 2676.

2654. Disconnect R19 lead (4) from terminal.

2655. Use VOM to measure OHMS. Connect positive test lead to R19 lead (4), common test lead to terminal (7).

2656. Check that VOM indicates 18 ohms or more. If not, replace resistor R19 (6). Go to step 2676.

2657. Repair or replace wiring and connectors as necessary.

2658. Reconnect R19 lead to terminal (5).

2659. Go to step 2676.

2660. Next, Replace Detector Cell Assembly procedure begins at 7-21. Go on to step when finished.

2661. Reinstall Photomultiplier Temperature Control P.C. Board.

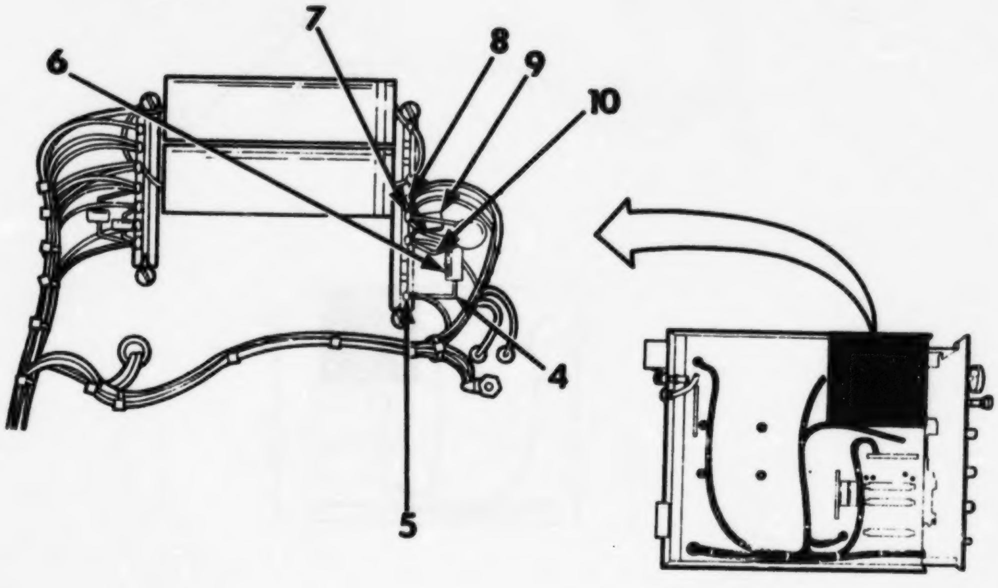
2662. Go to step 1.

2663. Reconnect P6 to detector cell.

2664. Reinstall Photomultiplier Temperature Control P.C. Board.

2665. Go to step 1.

2666. Disconnect C5 lead (10) from terminal.



2667. Use VOM to measure OHMS. Connect positive test lead to J2 pin 9 (7), common test lead to J2 pin 10 (8).

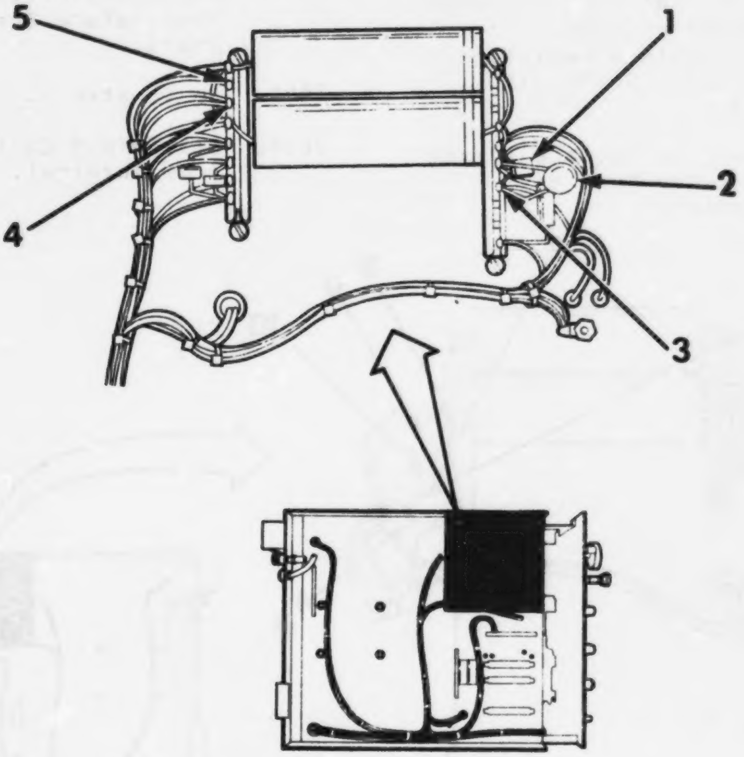
2668. Check that VOM indicates 500K ohms or more. If not, go to step 2670.

2669. Replace capacitor C5 (2). Go to step 2676.

2670. Disconnect wire (6) from terminal.

2671. Use VOM to measure OHMS. Connect positive test lead to J2 pin 9 (7), common test lead to J2 pin 10 (8).

2672. Check that VOM indicates 500K ohms or more. If not, repair or replace wiring and connectors as necessary; go to step 2674.



2673. Replace transistor Q3 (1).

2674. Reconnect wire to terminal (3).

2675. Reconnect C5 lead to terminal (3).

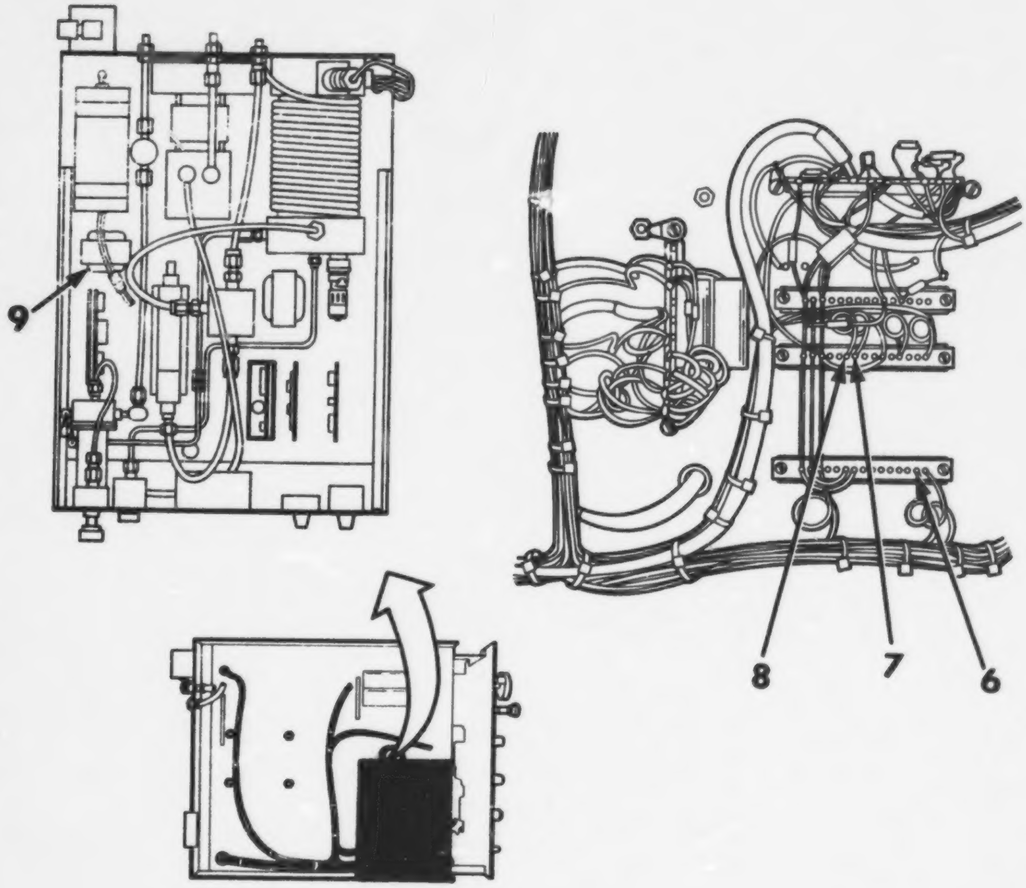
2676. Reinstall Photomultiplier Temperature Control P.C. Board.

2677. Go to step 1.

2678. Use VOM to measure VAC. Connect positive test lead to terminal (5), common test lead to terminal (4).

2679. Check that VOM indicates 100 VAC or more. If not, repair or replace wiring and connectors as necessary; go to step 1.

2680. Replace transformer T3 (9). Go to step 1.



SECTION 7. CORRECTIVE MAINTENANCE

REPLACE PUMP ASSEMBLY

INPUT CONDITIONS

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

Serviceable Pump Assembly

Personnel Required:

One Technician

Equipment Conditions:

Poor pump performance
Reed valve assembly and plumbing proven good
Monitor disconnected from power source
All external plumbing disconnected

NOTE

MOD C pumps do not have a fan assembly, and pump mounting plate does not have a fan housing.

NOTE

The pump assembly is a sealed unit. Do not attempt repair or disassembly in the field.

CAUTION

To avoid damage to fittings in Monitor, teflon fitting should be tightened finger tight. Metal fittings should be tightened finger tight plus 3/4 turn with a wrench.

1. Set POWER switch (1) to OFF.
2. Remove four screws (4) and top cover (2).
3. Remove four screws (5) and bottom cover (3).
4. Disconnect tubing (6) from selector valve (7).
5. Loosen SAMPLE INLET fitting (11) and slide tubing (6) to rear of monitor.
6. Remove covers (12) from wire nuts (13).
7. Tag and disconnect wiring from pump assembly (14).

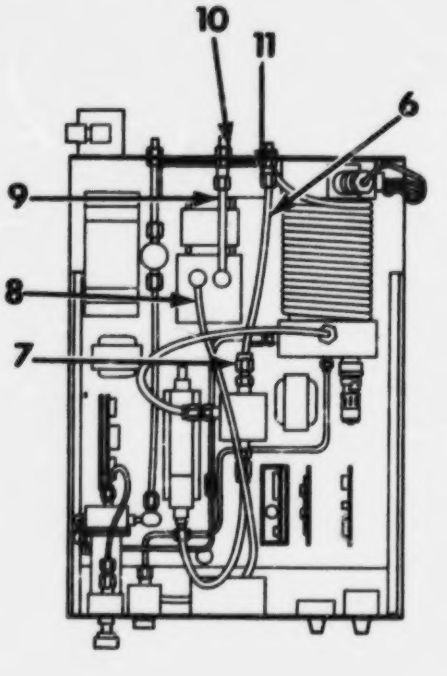
NOTE

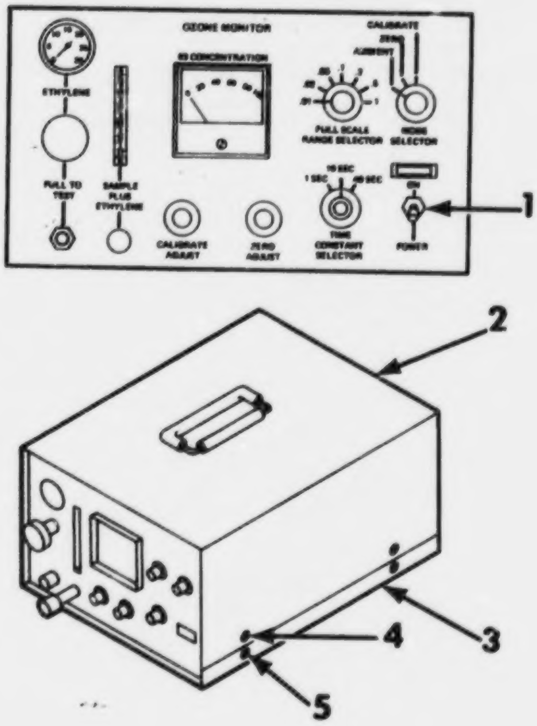
Inlet and outlet ports on MOD C pumps are located on front side of pump assembly.

8. Disconnect pump inlet tubing (8).
9. Disconnect pump outlet tubing (9).

NOTE

It is not necessary to remove EXHAUST fitting when removing MOD C pump assemblies.




OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
1 SEC
10 SEC
TIME CONSTANT SELECTOR
ON
POWER
1
2
4
3
5

10. Remove EXHAUST fitting (10).

NOTE

Support pump while performing following step.

11. Remove four nuts (18) securing pump mounting plate (17).

12. Remove pump assembly (14).

NOTE

MOD C pumps have no fan assembly attached to them.

13. Remove two bolts (16).

14. Remove pump (15) from mounting plate (17).

CAUTION

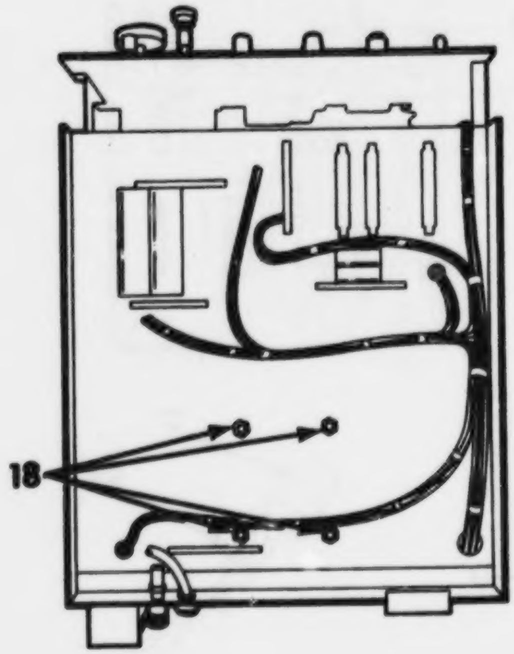
The pump assembly is a sealed unit. Do not attempt repair or disassembly in the field.

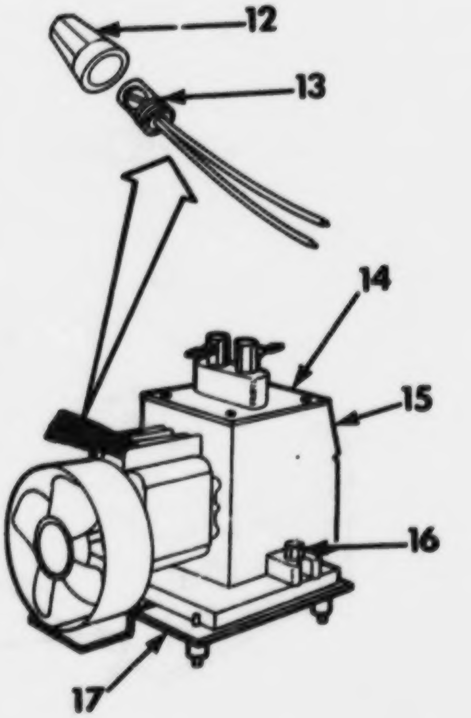
NOTE

MOD C mounting plates do not have a cooling fan housing.

15. Install new pump (15) on mounting plate (17) and secure with bolts (16).

16. Reinstall pump assembly (14) and secure with nuts (18).





17. Reinstall EXHAUST fitting (5).

18. Connect pump outlet tubing (4).

19. Connect pump inlet tubing (3).

20. Connect pump wiring with wire nuts (8) and install covers (7).

21. Connect Sample Inlet tubing (1) to selector valve (2).

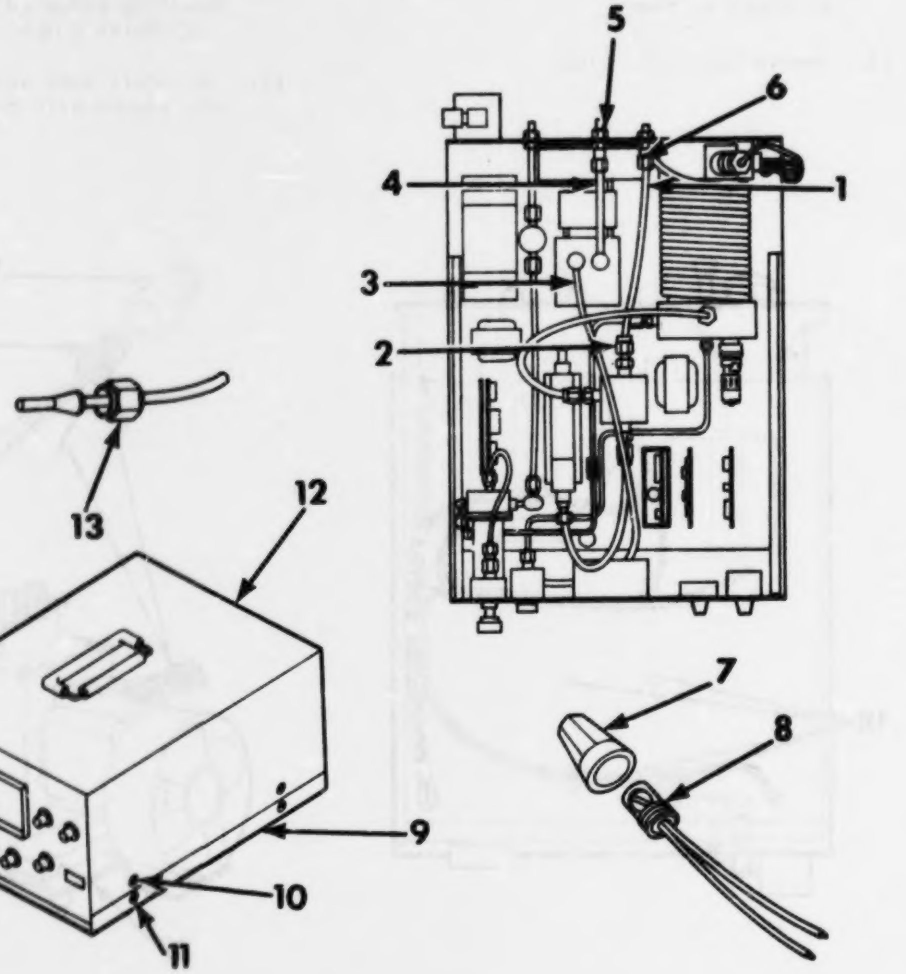
22. Tighten SAMPLE INLET fitting (6).

23. Install bottom cover (9) and secure with screws (11).

24. Install top cover (12) and secure with screws (10).

25. Connect stainless steel tubing (13) to ETHYLENE fitting (16).

26. Connect teflon filter (17) to SAMPLE INLET fitting (14).

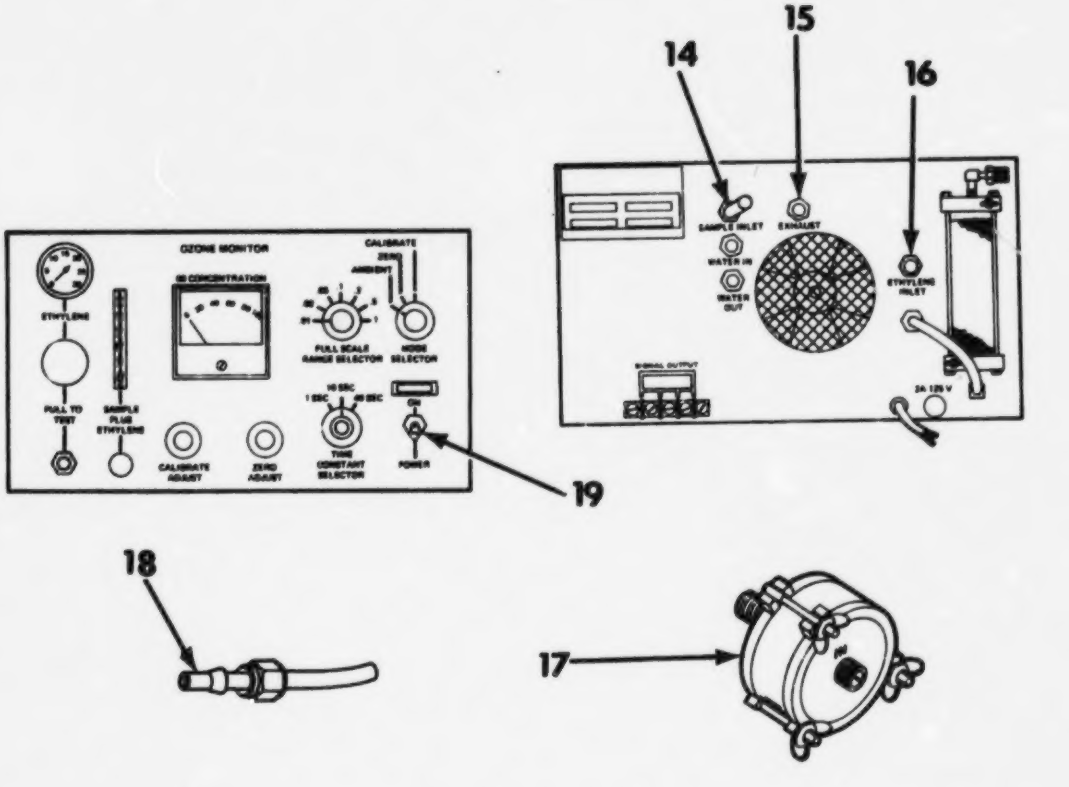


27. Connect exhaust tubing (18) to EXHAUST fitting (15).

28. Set POWER switch (19) to ON.

29. Recheck calibration. Refer to Calibrate the Ozone Monitor, page 4-9.

END OF ACTIVITY


15
14
16
SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
3A 125 V
OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
POWER
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
19
18
17

CLEAN THE REED VALVE ASSEMBLY

INPUT CONDITIONS

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

None

Personnel Required:

One Technician

Equipment Conditions:

Sample plumbing proven good
SAMPLE PLUS ETHYLENE flowrate
cannot be maintained

CAUTION

The pump assembly is a sealed unit. Do not attempt repair or disassembly in the field.

CAUTION

Do not pry on reed valve assembly with any tool. This may damage the valve assembly or the sealing surface.

CAUTION

When cleaning reed valve assembly, use extreme caution to prevent distorting or damaging the reeds.

Preceding page blank

1. Set POWER switch (1) to OFF.
2. Disconnect monitor power cable from primary power source.
3. Remove four screws (4) and top cover (3).

NOTE

Inlet and outlet ports on MOD C pumps are located on front side of pump assembly.

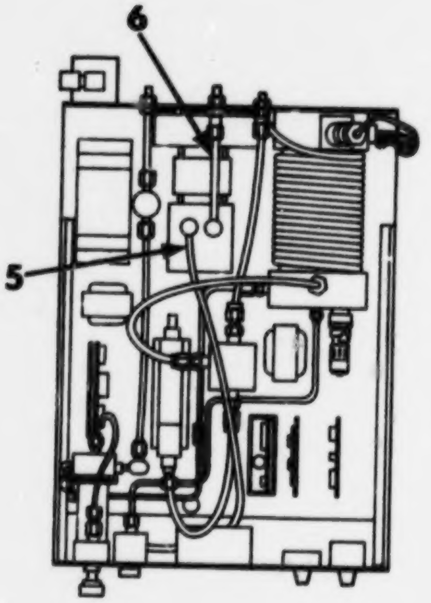
4. Disconnect pump inlet tubing (5).
5. Disconnect pump outlet tubing (6).
6. Remove four screws (7).
7. Remove pump head (10).

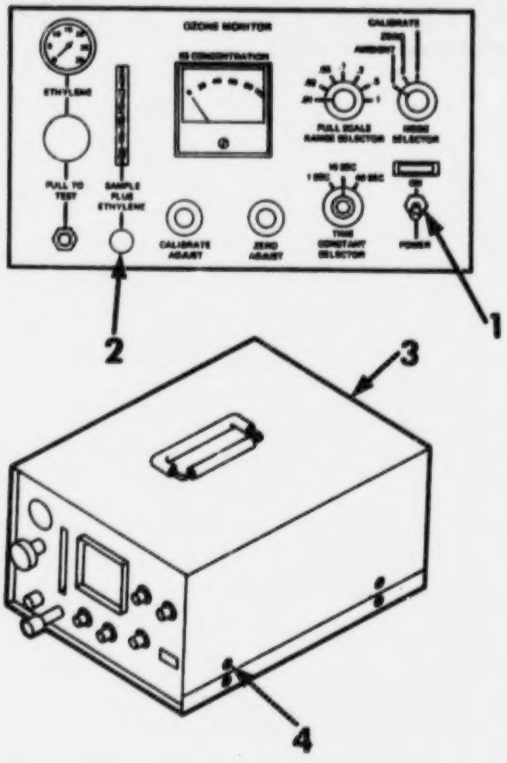
CAUTION

Note the position of the scribed line extending from pump casting onto the face of reed valve assembly.

CAUTION

Do not pry on reed valve assembly with any tool. This may damage the valve assembly or the sealing surface.




OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
FULL SCALE RANGE SELECTOR
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
1
2
3
4

8. Remove valve assembly (8) by lifting it with the fingers.

CAUTION

When cleaning reed valve assembly, use extreme caution to prevent distorting or damaging the reeds.

9. Remove any foreign matter from under reeds (9).

10. Reinstall valve assembly (8).

NOTE

Insure that scribe marks on valve assembly and pump casting are aligned.

11. Reinstall pump head (10) and secure with screws (7).

12. Connect pump inlet tubing (5).

13. Connect pump outlet tubing (6).

14. Connect monitor power cable to 115 VAC, 60 Hz source.

15. Set POWER switch (1) to ON.

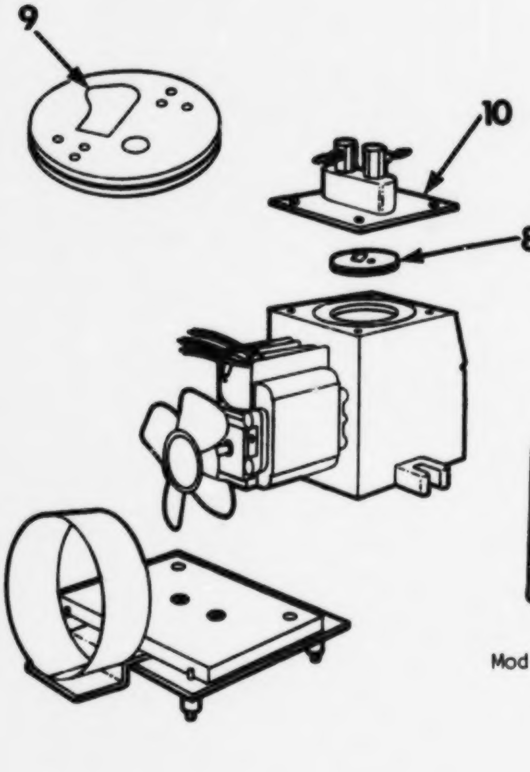
16. Adjust SAMPLE PLUS ETHYLENE flowmeter (2) to value specified on Supplied Data Sheet.

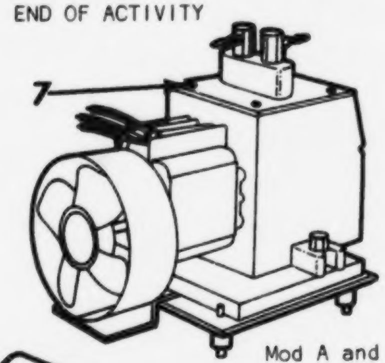
NOTE

If correct SAMPLE PLUS ETHYLENE flowrate cannot be obtained, replace pump assembly. Refer to Replace Pump Assembly, page 6-1.

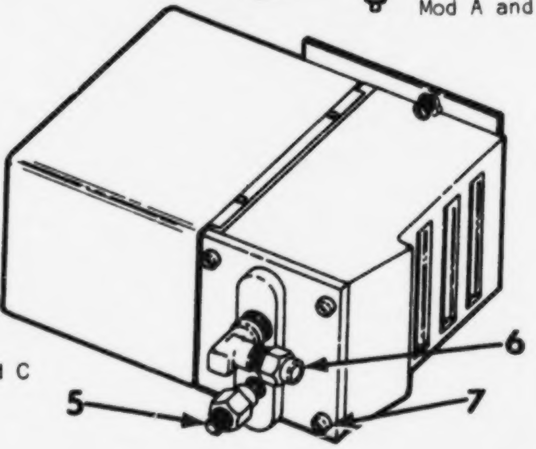
17. Recheck calibration. Refer to Calibrate the Ozone Monitor, page 4-9.

END OF ACTIVITY





Mod A and B



Mod C

REPLACE THE INTERNAL OZONE GENERATOR UV LAMP

INPUT CONDITIONS

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

Serviceable UV Lamp

Personnel Required:

One Technician

Equipment Conditions:

Ultra-violet Lamp proven defective
Internal Ozone Generator inoperative

CAUTION

To avoid damage to fittings in Monitor, teflon fittings should be tightened finger tight.

CAUTION

Be extremely careful when connecting/disconnecting fittings from quartz tube. The quartz tube is very fragile.

NOTE

In late model monitors, the Ozone Generator is located in the left rear corner.

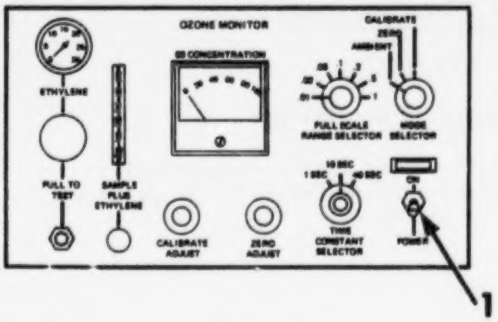
Preceding page blank

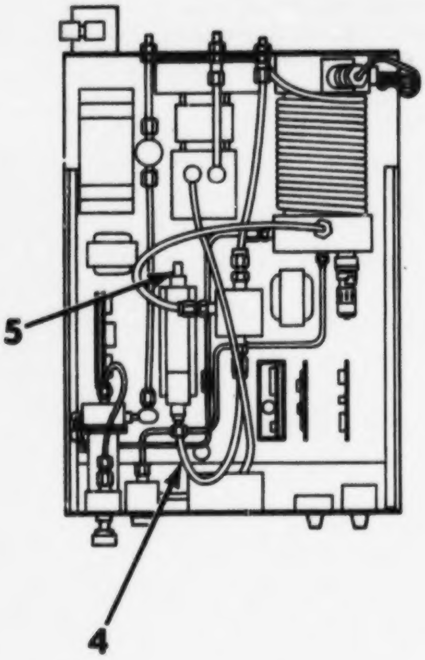
1. Set POWER switch (1) to OFF.
2. Disconnect monitor power cord from primary power source.
3. Remove four screws (3) and top cover (2).

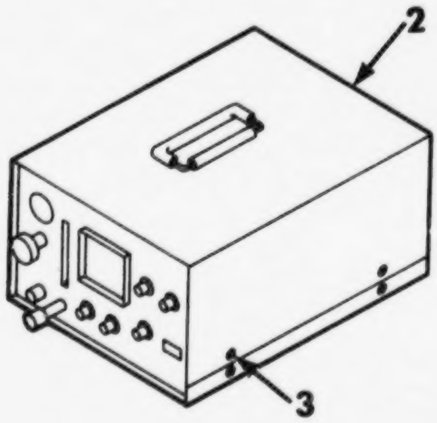
CAUTION

Be extremely careful when disconnecting fittings from quartz tube. The quartz tube is very fragile and breaks easily.

4. Disconnect inlet tubing (5) from quartz tube.
5. Disconnect outlet tubing (4) from quartz tube.


OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
1





6. Disconnect lamp cord (8).

7. Remove four screws (9).

8. Remove Ozone Generator (10).

9. Loosen two setscrews (11).

10. Slide lamp (7) out of generator.

NOTE

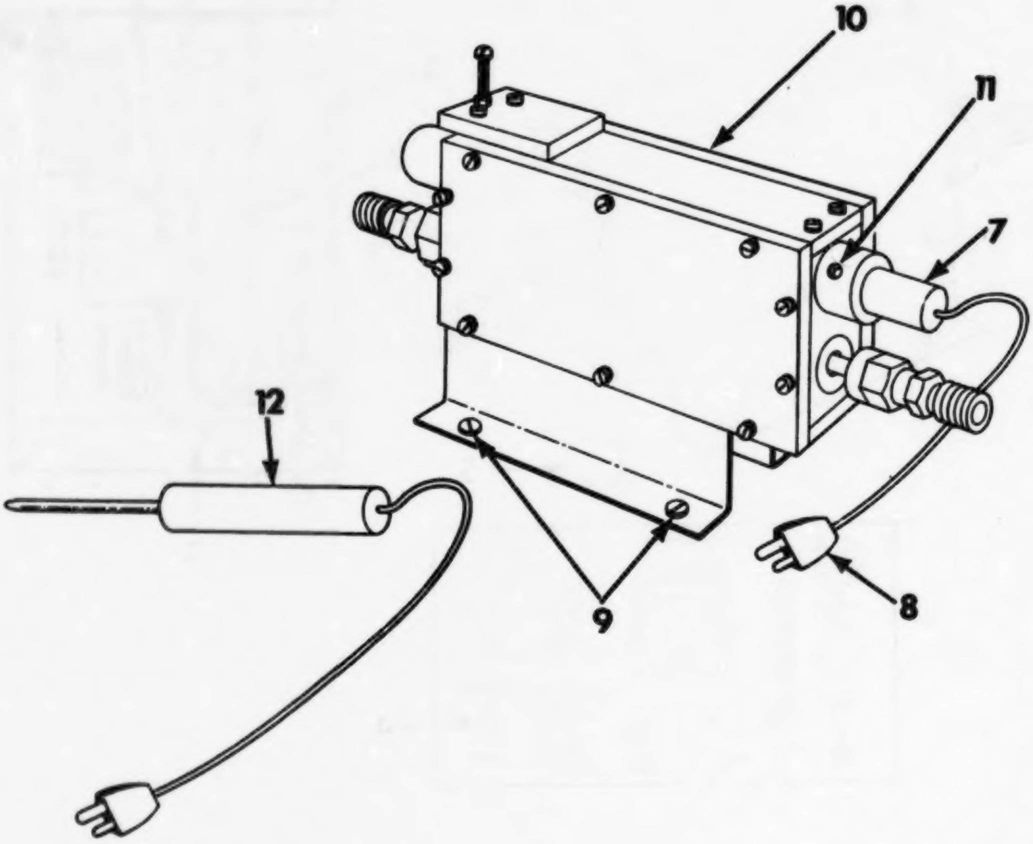
MOD C Ozone Generator lamps are secured with a nut and teflon ferrules. Loosen nut and slide lamp from generator.

11. Install new lamp assembly (12).

NOTE

On MOD C generators, note position of ferrules on defective lamp. Remove ferrules and install on new lamp. Install lamp assembly into generator and secure with nut.

12. Secure lamp assembly (12) with setscrews (11).



13. Reinstall Ozone Generator (10) with four screws (9).

CAUTION

Be extremely careful when connecting teflon fittings to quartz tube. The quartz tube is very fragile and breaks easily.

14. Connect outlet tubing (1) to quartz tube.

15. Connect inlet tubing (2) to quartz tube.

16. Connect lamp cord (5) to power supply (3).

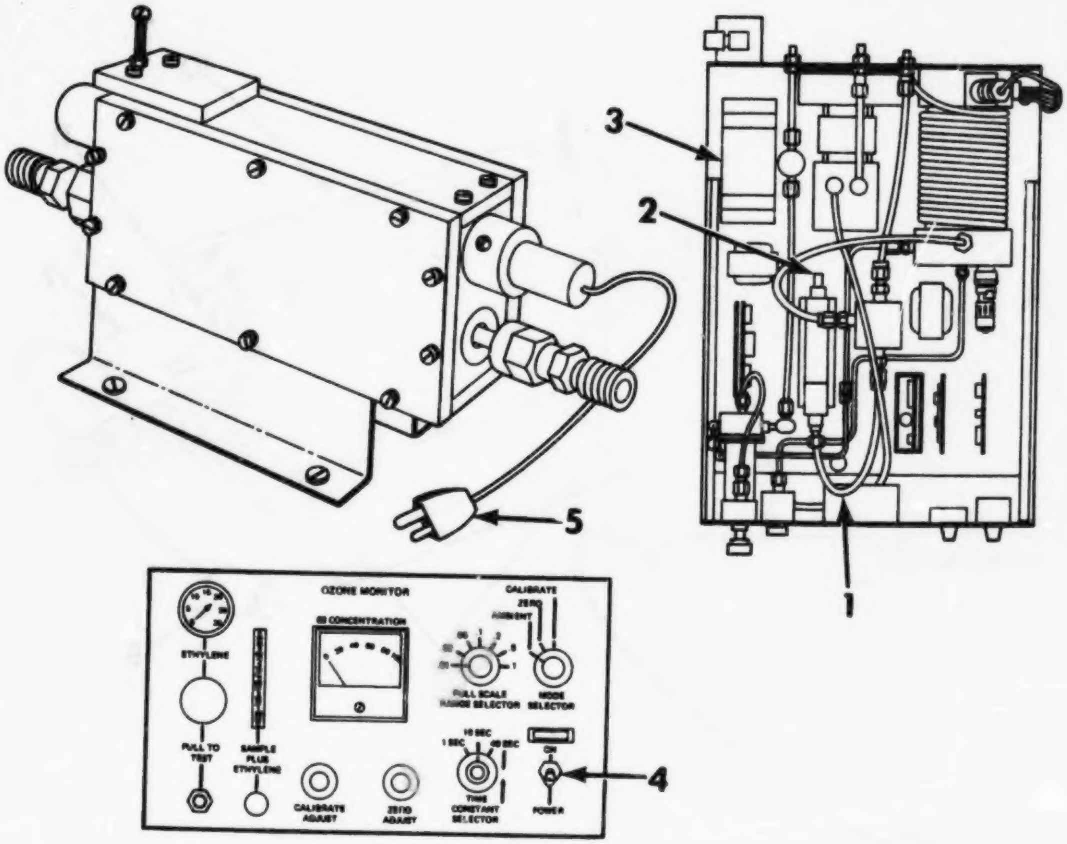
17. Install top cover and secure with screws.

18. Connect monitor power cord to 115 VAC, 60 Hz source.

19. Set POWER switch (4) to ON.

20. Recalibrate Ozone Generator. Refer to Adjust the Internal Ozone Generator, page 7-27.

END OF ACTIVITY


3
2
5
1
OZONE MONITOR
CALIBRATE
ZERO
AMBIENT
ETHYLENE
CONCENTRATION
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
4

REPLACE THE INTERNAL OZONE GENERATOR QUARTZ TUBE

INPUT CONDITIONS

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

Quartz Tube

Personnel Required:

One Technician

Equipment Conditions:

Internal Ozone Generator Inoperative
Quartz Tube broken or damaged

CAUTION

Be extremely careful when connecting fittings to quartz tube. The quartz tube is very fragile and breaks easily.

CAUTION

To avoid damage to fittings in Monitor, teflon fittings should be tightened finger tight.

NOTE

In MOD C Monitors, the Ozone Generator is located in the left rear corner.

1. Set POWER switch (1) to OFF.
2. Disconnect monitor power cord from primary power source.
3. Remove four screws (2) and top cover (3).

CAUTION

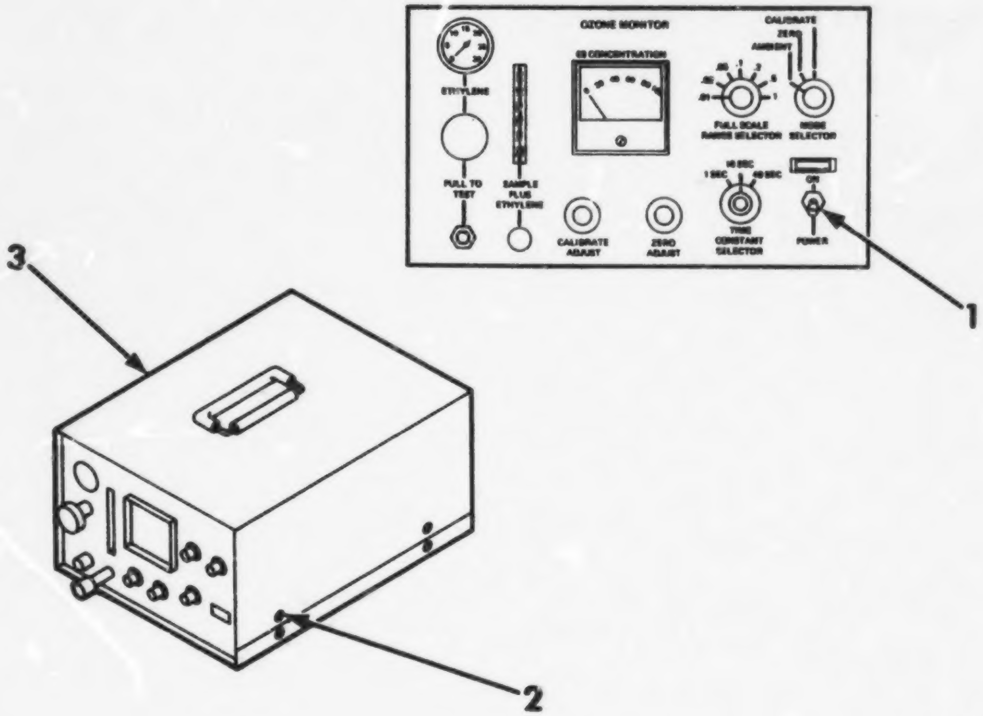
Be extremely careful when disconnecting fittings from quartz tube. The quartz tube is very fragile and breaks easily.

4. Disconnect inlet tubing (5) from quartz tube.
5. Disconnect outlet tubing (4) from quartz tube.
6. Disconnect lamp cord (8) from power supply (6).
7. Remove four screws (10).
8. Remove Ozone Generator (11).
9. Loosen two setscrews (14).

NOTE

MOD C Ozone Generator lamps are secured with a nut and teflon ferrules. Loosen nut and slide lamp from generator. Do not change position of ferrules.

10. Slide lamp (7) out of generator (11).


OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
FULL SCALE RANGE SELECTOR
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
1
3
2

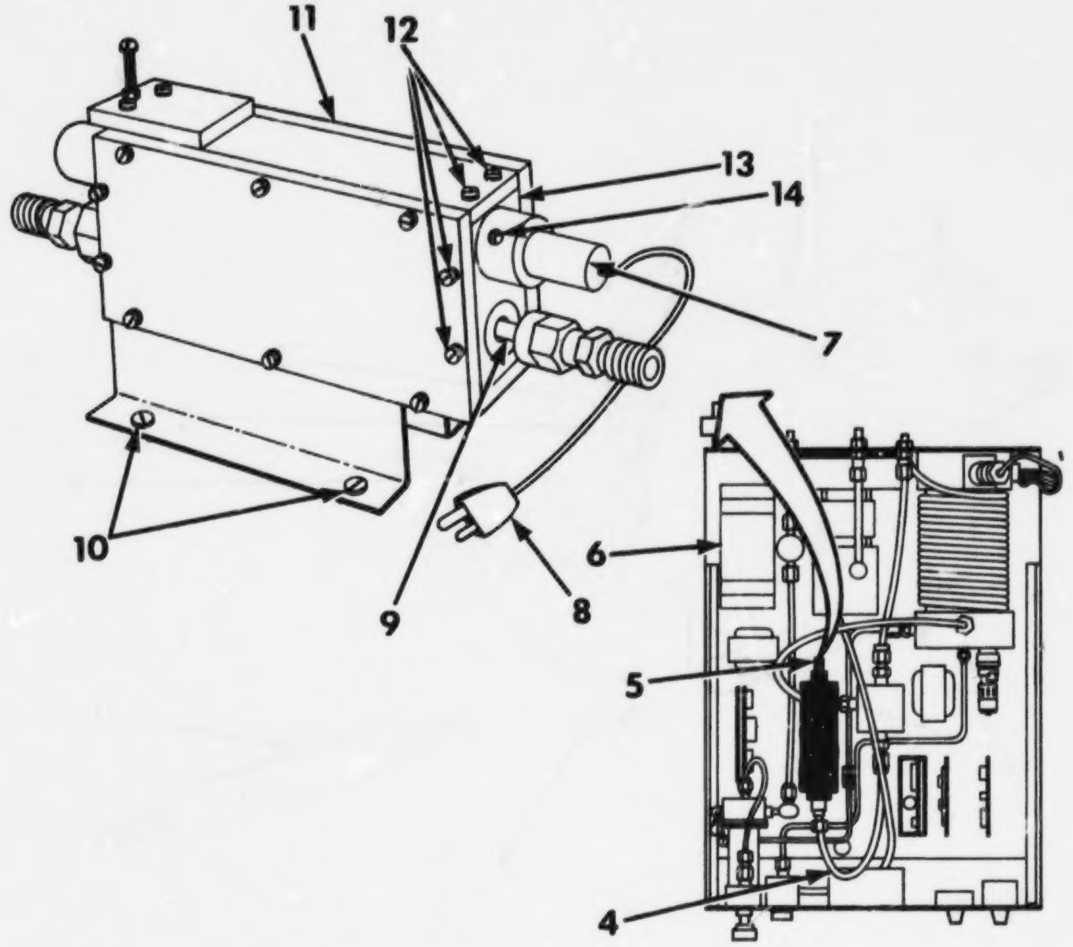
11. Remove eight screws (12) securing end block (13).

NOTE

End blocks on MOD C generators are secured with four screws. Remove four screws and end block.

12. Remove end block (13).

13. Remove quartz tube (9).



14. Install new quartz tube (1).

15. Reinstall end block (2) and secure with screws (8).

16. Reinstall lamp (4) and secure with setscrews (3).

NOTE

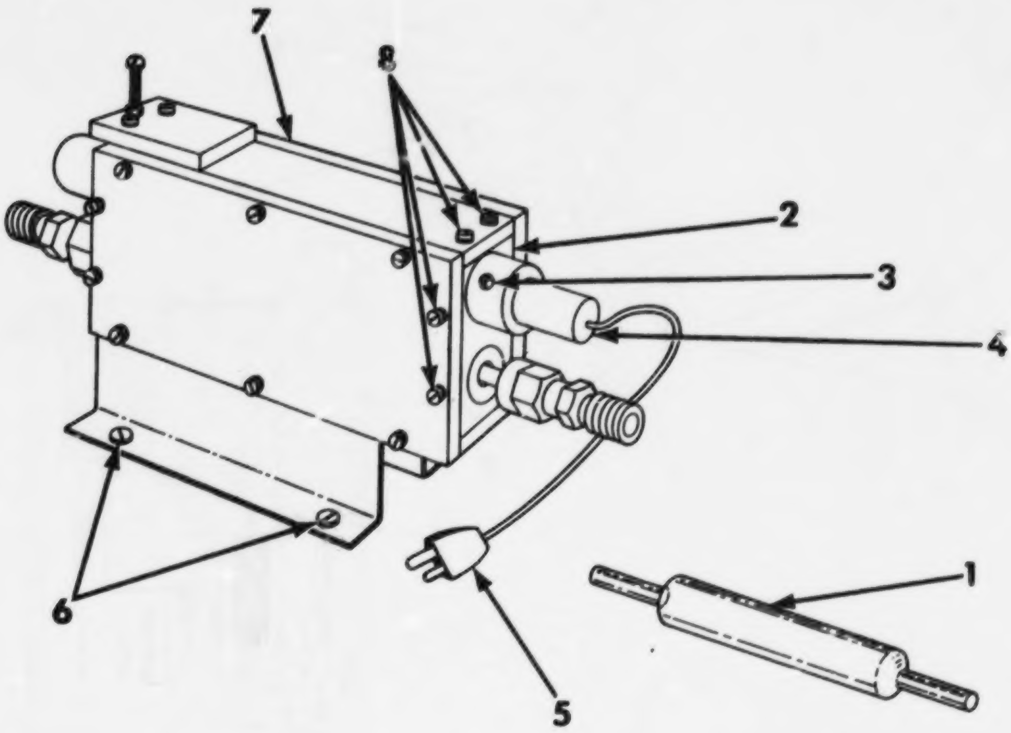
ON MOD C generators, reinstall lamp and secure with nut.

17. Reinstall Ozone Generator (7) and secure with screws (6).

CAUTION

Be extremely careful when connecting fittings to quartz tube. The quartz tube is very fragile and breaks easily.

18. Connect outlet tubing (9) to quartz tube.



19. Connect inlet tubing (10) to quartz tube.

20. Connect lamp cord (5) to power supply (11).

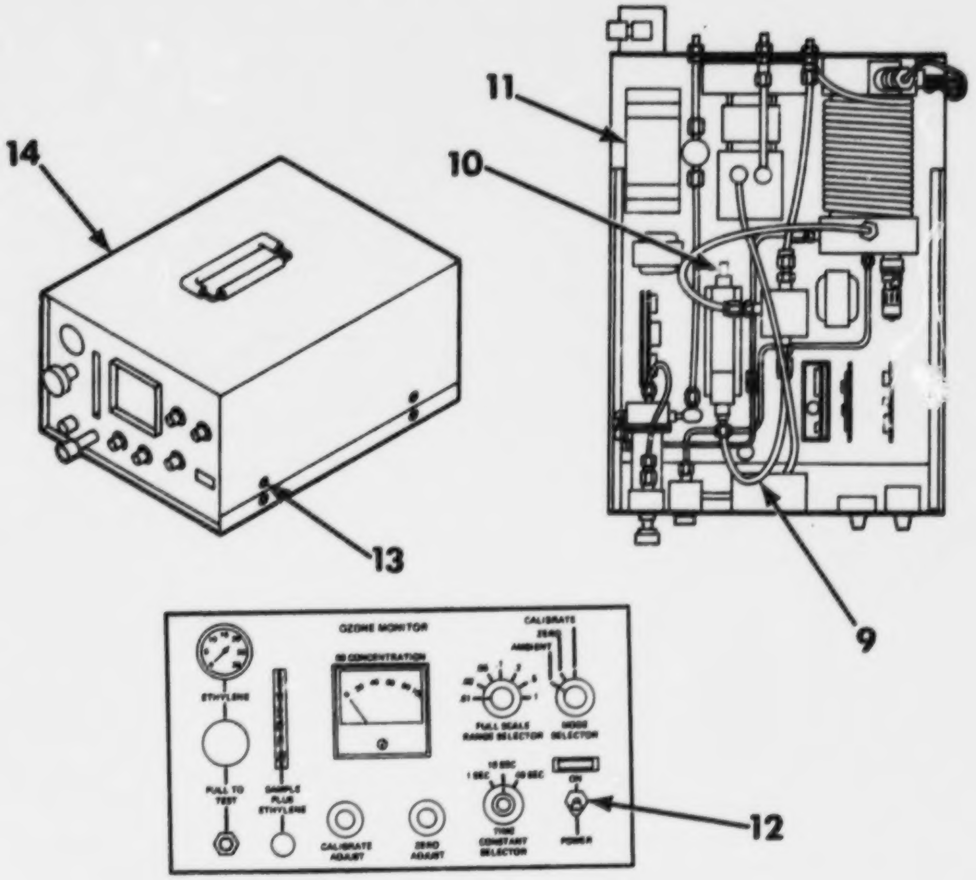
21. Connect power cord to 115 VAC, 60 Hz source.

22. Set POWER switch (12) to ON.

23. Recalibrate Ozone Generator. Refer to Adjust the Internal Ozone Generator, page 7-27.

24. Install top cover (14) and secure with screws (13).

END OF ACTIVITY


11
14
10
13
9
OZONE MONITOR
CALIBRATE
ZERO
AMBIENT
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
1 SEC
10 SEC
30 SEC
ON
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
12

REPLACE THE DETECTOR CELL ASSEMBLY

INPUT CONDITIONS

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

Serviceable Detector Cell

Personnel Required:

One Technician

Equipment Conditions:

Detector Cell proven defective.
Monitor shut off and disconnected from primary power source and external plumbing.

WARNING

Detector Cell is a factory sealed unit. No attempt should be made to repair it in the field.

NOTE

To avoid damage to fittings in Monitor, teflon fittings should be tightened finger tight. Metal fittings should be tightened finger tight plus 3/4 turn with a wrench.

Preceding page blank

1. Set POWER switch (2) to OFF.

2. Remove four screws (3) and top cover (2).

NOTE

If repairing MOD C, remove four screws (4). Remove chassis from bottom cover (5).

3. Disconnect connector (14).

4. Disconnect BNC connector (15).

5. Disconnect connector (6).

6. Disconnect tubing at SAMPLE IN fitting (13).

7. Disconnect tubing at Selector Solenoid Valve (11) and remove from monitor.

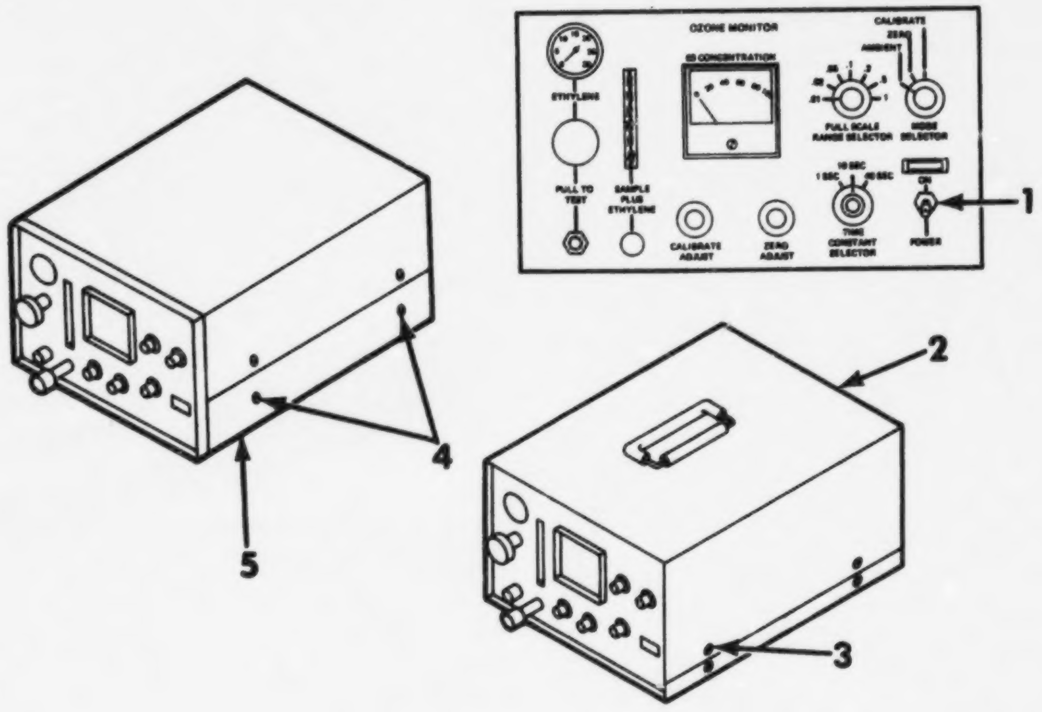
8. Disconnect black tubing from top of detector cell (16).

NOTE

Tubing extends 2-1/2 inches into detector cell.

9. Disconnect black tubing from solenoid valve (10) and remove from monitor.

10. Disconnect exhaust tubing from front of detector cell (7).


OZONE MONITOR
CONCENTRATION
CALIBRATE
ZERO
AMBIENT
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
PULL TO TEST
SAMPLE PLUS ETHYLENE
10 SEC
1 SEC
40 SEC
ON
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
1
2
4
5
3

11. Disconnect ethylene tubing (9) from fitting (8).

NOTE

Ethylene tubing extends 2-1/2 inches into detector cell.

12. Disconnect ethylene tubing from side of detector cell (12) and remove from monitor.

NOTE

Some early model detector cells have a water cooling coil. Cooling coil must be disconnected from rear of monitor before removing detector cell.

NOTE

If repairing MOD C, remove screw from bottom of chassis.

13. Remove two screws (18) securing cell (17).

14. Remove detector cell (17).

15. Position serviceable detector cell (17) into chassis.

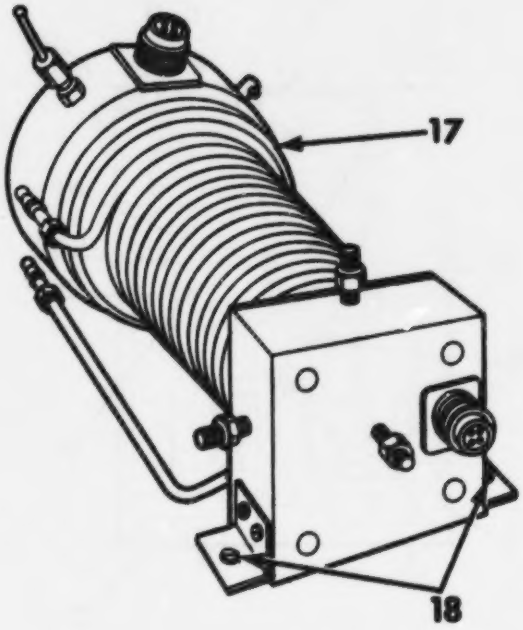
16. Install two screws (18).

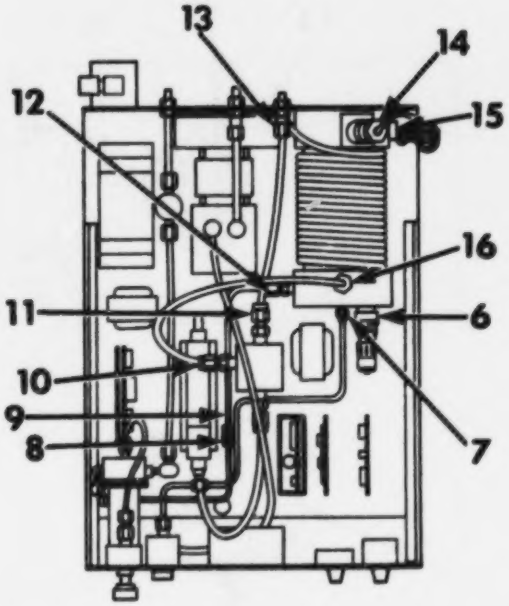
NOTE

If repairing MOD C, install screw in bottom of chassis.

NOTE

If detector cell being installed is an early model with a cooling coil, connect the cooling coil to fittings on rear of monitor. If no fittings are provided, secure coil to prevent interfering with cell electrical connections.





17. Insert ethylene tubing (3) 2-1/2 inches into detector cell.

18. Connect ethylene tubing to fitting (11) of detector cell.

19. Connect ethylene tubing to fitting (4).

20. Connect exhaust tubing to fitting (2) of detector cell.

21. Connect black tubing to solenoid valve (5).

22. Insert tubing (7) 2-1/2 inches into detector cell.

23. Connect black tubing to top of cell (12).

24. Connect tubing to solenoid valve (6).

25. Connect tubing to SAMPLE INLET fitting (8).

26. Connect connector (1) to front of cell.

27. Connect BNC connector (10) to rear of cell.

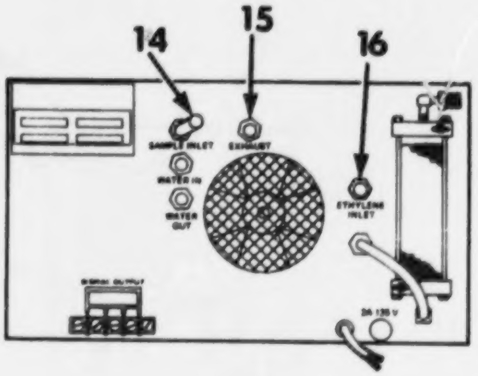
28. Connect connector (9) to rear of cell.

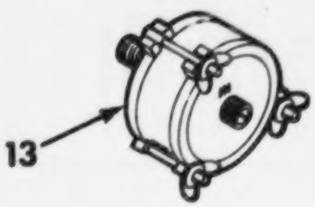
NOTE

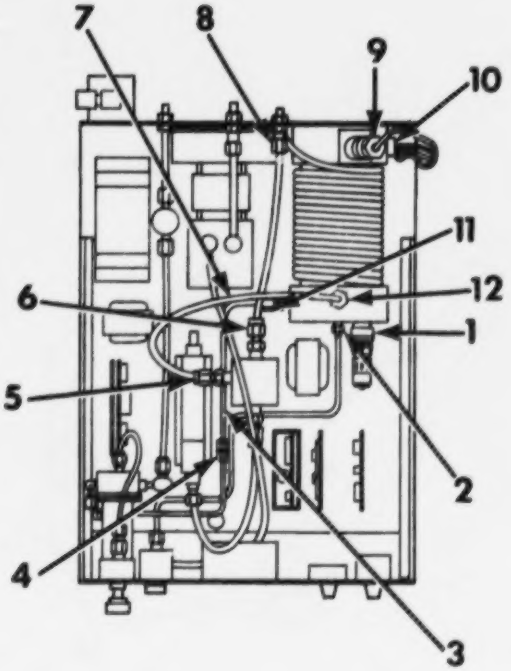
If repairing MOD C, reinstall chassis in bottom cover and secure with screws.

29. Connect stainless steel tubing to ETHYLENE fitting (16).

30. Connect teflon filter (13) to SAMPLE INLET fitting (14).


14
15
16
SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
2A 125 V




7
8
9
10
11
6
12
1
5
2
4
3

31. Connect exhaust tubing to EXHAUST fitting (15).

32. Rotate ethylene cylinder valve (19) counterclockwise until pressure is indicated on gauge (18).

33. Connect monitor power plug to 115 VAC, 60 Hz line.

34. Set POWER switch (17) to ON.

35. Check plumbing connections for leaks. Refer to Check Sample and Calibration Sample Flowpath, page 6-31.

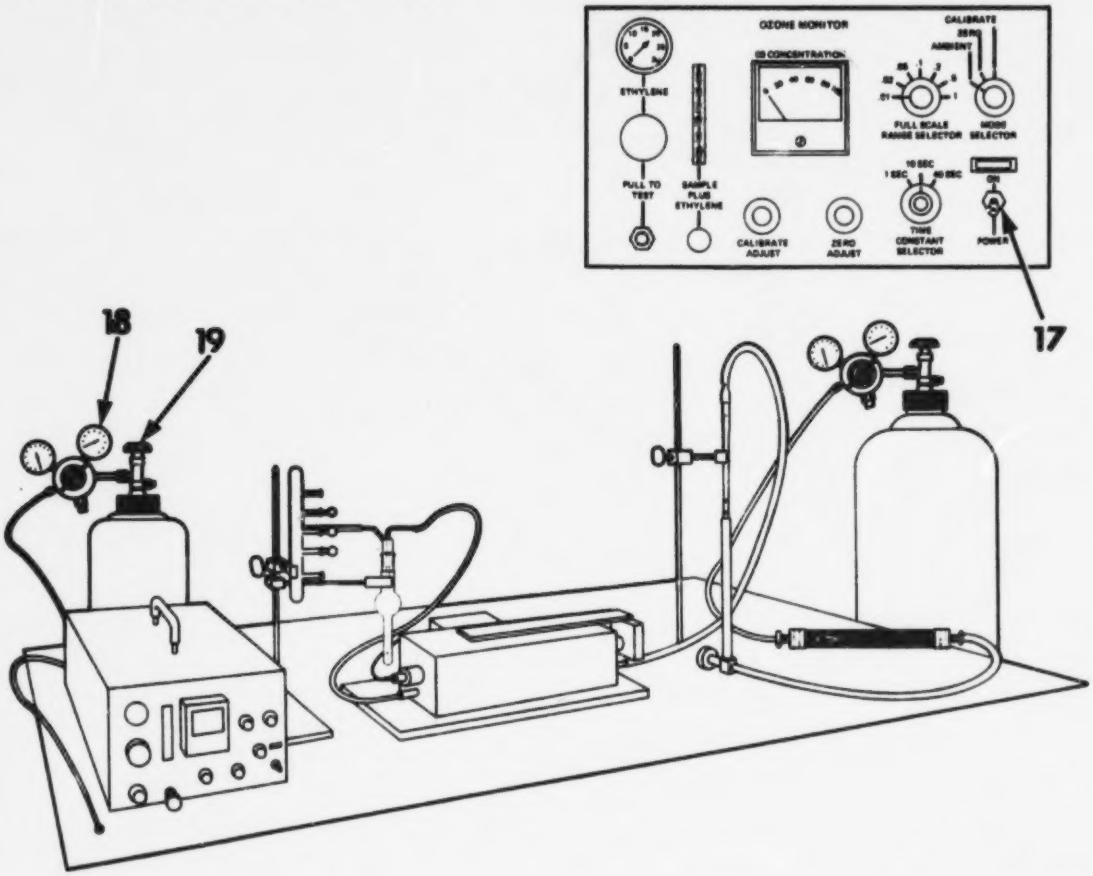
36. Set POWER switch (17) to OFF.

37. Install top cover and secure with screws.

38. Set POWER switch (17) to ON.

39. Recheck calibration. Refer to Calibrate the Ozone Monitor, page 4-9.

END OF ACTIVITY


OZONE MONITOR
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
O3 CONCENTRATION
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
17
18
19

ADJUST THE INTERNAL OZONE GENERATOR

INPUT CONDITIONS

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

Calibration Data Log

Personnel Required:

One Technician

Equipment Conditions:

Start Up the Ozone Monitor performed. Refer to page 3-1.
Calibrate the Ozone Monitor performed. Refer to page 4-9.

WARNING

Use extreme caution when adjusting Ozone Generator. Power is applied to the Monitor during this procedure.

Preceding page blank

1. Remove four screws (3) and top cover (2).

WARNING

Use extreme caution when adjusting Ozone Generator. Power is applied to the monitor during this procedure.

2. Loosen positioning lock screw (5).

3. Adjust knob (4) until 03 CONCENTRATION meter (1) indicates between 50% and 75% of meter scale.

NOTE

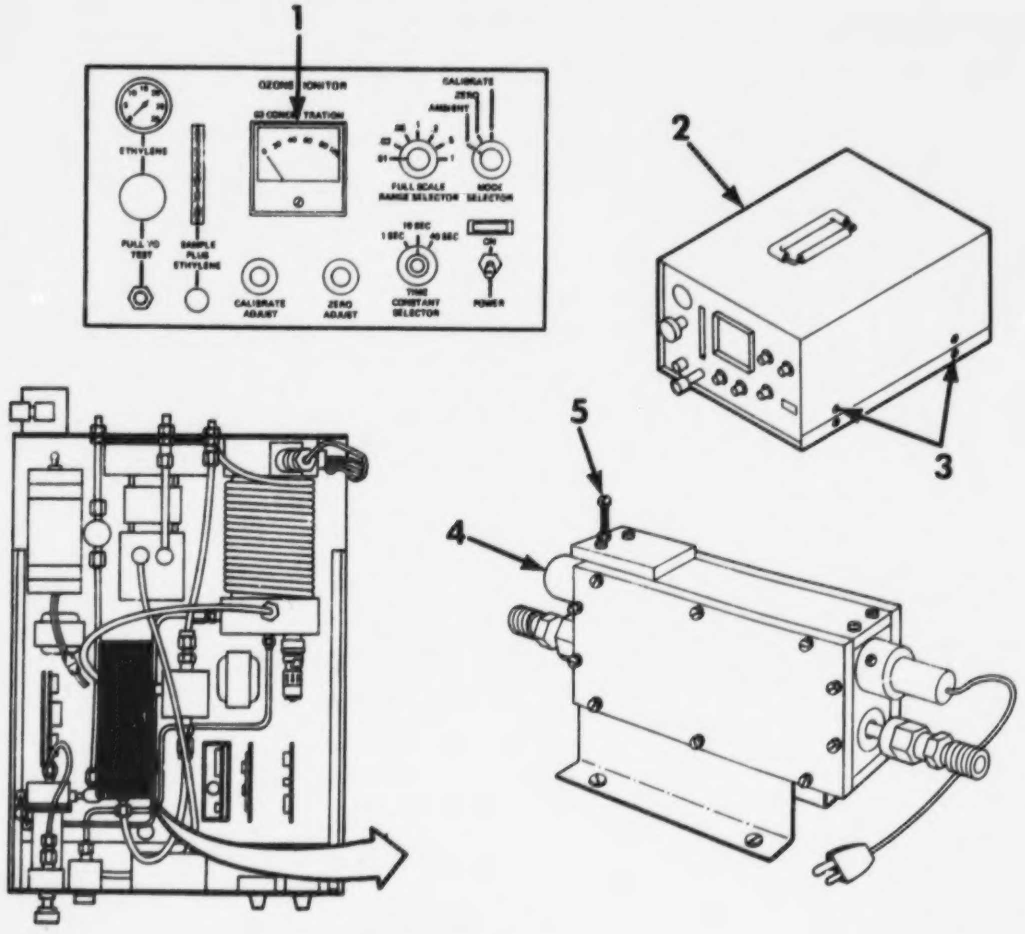
After adjusting generator, wait 15 minutes for monitor to stabilize. Check 03 CONCENTRATION meter indication, readjust if necessary.

4. Tighten positioning lock screw (5).

5. Reinstall top cover (2) and secure with screws (3).

6. Record 03 CONCENTRATION meter indication on Calibration Data Log.

END OF ACTIVITY


1
OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
FULL SCALE RANGE SELECTOR
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
2
3
5
4

CHECK THE SAMPLE AND CALIBRATION SAMPLE FLOWPATH

INPUT CONDITIONS

Applicable Mods:

All

Special Tools and Test Equipment:

None

Supplies:

Vinyl tubing 3/16 I.D., 18" length
Teflon tubing, 1/4 O.D., 8" length
2 SWAGELOK fittings and ferrules
1 SWAGELOK male connector
Liquid Leak Detector Solution
Data Sheet (Supplied with Monitor)

Personnel Required:

One Technician

Equipment Conditions:

Ozone Monitor disconnected from all external plumbing
Leak suspected in Sample and/or Calibration Sample Flowpaths

WARNING

Use extreme caution when performing check. Power is applied to the Monitor and electric shock is possible during this procedure.

CAUTION

To avoid damage to fittings in Monitor, teflon fittings should be tightened finger tight. Metal fittings should be tightened finger tight plus 3/4 turn with a wrench.

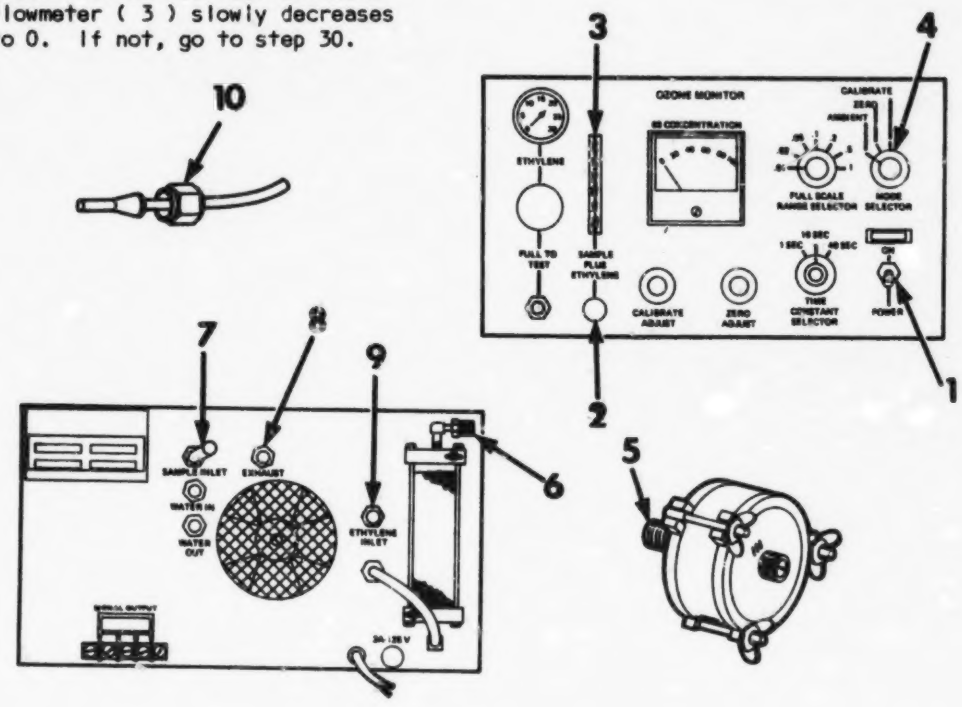
CAUTION

Be extremely careful when repairing fittings on quartz tube. The quartz tube is very fragile and breaks easily.

1. Set POWER switch (1) to ON.
2. Set MODE SELECTOR switch (4) to ZERO.
3. Adjust SAMPLE PLUS ETHYLENE flowmeter (2) to value specified on Data Sheet.
4. Using a finger, seal off air flow at Calibration Sample Filter Inlet (6). Check that SAMPLE PLUS ETHYLENE flowmeter (3) slowly decreases to 0. If not, go to step 12.
5. Remove finger from inlet (6).
6. Set MODE SELECTOR switch (4) to AMBIENT.
7. Using a finger, seal off air flow at SAMPLE INLET fitting (7). Check that SAMPLE PLUS ETHYLENE flowmeter (3) slowly decreases to 0. If not, go to step 30.
8. Remove finger from inlet (7).
9. Connect stainless steel tubing (10) to ETHYLENE INLET fitting (9).
10. Connect teflon filter output (5) to SAMPLE INLET fitting (7).
11. Connect plastic tubing to EXHAUST fitting (8).

END OF CHECKOUT

12. If servicing MOD C, go to step 48.
13. Set POWER switch (1) to OFF.


10
3
4
OZONE MONITOR
O3 CONCENTRATION
CALIBRATE
ZERO
AMBIENT
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
ON
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
1
2
7
8
9
6
5
SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
3A 125V

14. Remove four screws (12) and top cover (11).

CAUTION

To avoid damage to fittings in monitor, teflon fittings should be tightened finger tight. Metal fittings should be tightened finger tight plus 3/4 turn with a wrench.

CAUTION

Be extremely careful when repairing fittings on quartz tube (13). The quartz tube is very fragile and easily broken.

15. Check that all fittings on the Calibration Sample Filter (15) Ozone Generator (19) Selector Solenoid (20) Reaction Chamber (21) flow gauge/Needle Valve Assembly (22) and evacuation pump (18) are tight. If not, tighten any loose fittings, reinstall top cover, and go to step 1.

16. Disconnect exhaust tubing (16) from pump (18).

17. Disconnect inlet tubing (14) from pump (18).

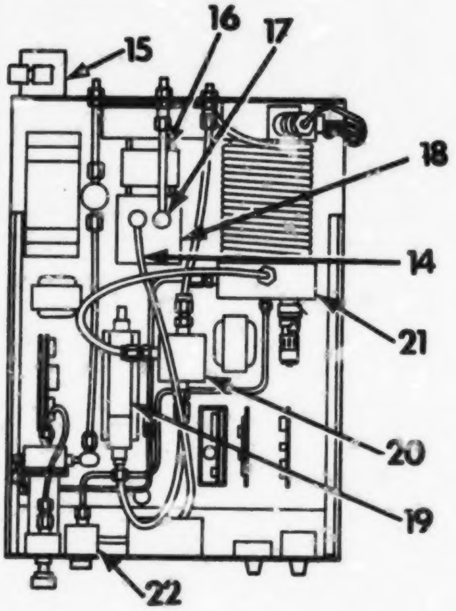
18. Connect inlet tubing (14) to pump exhaust outlet (17).

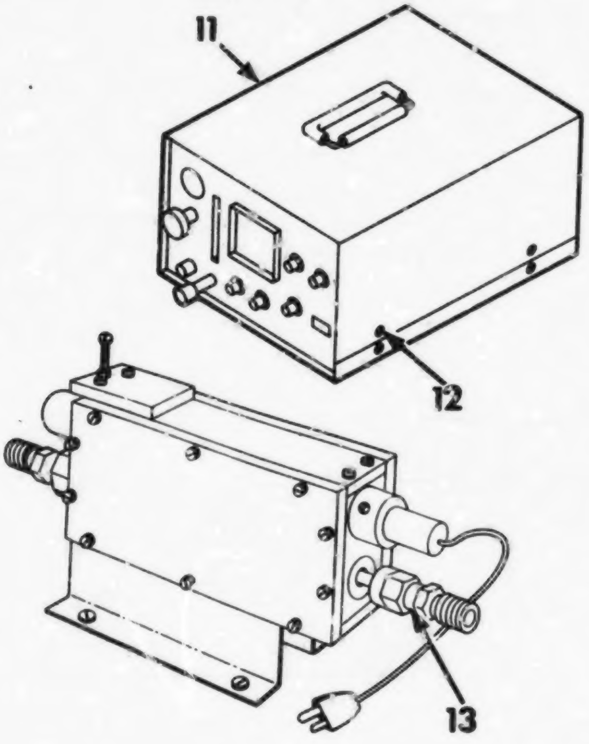
NOTE

If inlet tubing will not reach pump exhaust outlet, replace tubing with an 18" length of vinyl tubing.

WARNING

Use extreme caution when performing check. Power is applied to the monitor and electric shock is possible during this procedure.





19. Set POWER switch (1) to ON.

20. Seal off air flow at Calibration Sample Filter Inlet (3).

21. Apply Liquid Leak Detector solution to each fitting of the Calibration Sample Filter (9), Ozone Generator (15), Selector Solenoid (8), Reaction Chamber (16), flow gauge/needle valve assembly (17), and evacuation pump (14).

22. Check that bubbles do not appear on any fittings. If bubbles appear, repair or replace defective fitting and go to step 84.

23. Set POWER switch (1) to OFF.

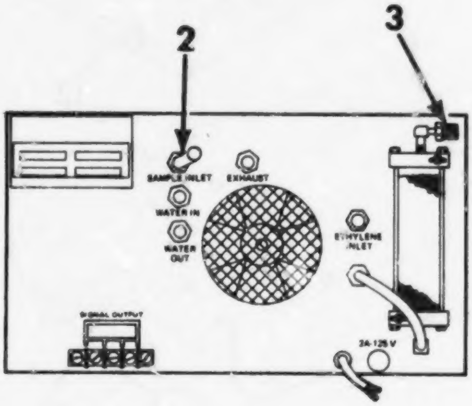
24. Replace Selector Solenoid Valve (8).

25. Disconnect inlet tubing from pump exhaust outlet (13).

26. Connect inlet tubing (6) to pump inlet (12).

Note

If an 18" length of vinyl tubing was substituted in step 18, reconnect the original tubing at this time.


2
3
SAMPLE INLET
EXHAUST
WATER IN
WATER OUT
ETHYLENE INLET
SIGNAL OUTPUT
2A-125 V

27. Connect exhaust tubing (10) to pump exhaust outlet (13).

28. Reinstall top cover and secure with screws.

29. Go to step 1.

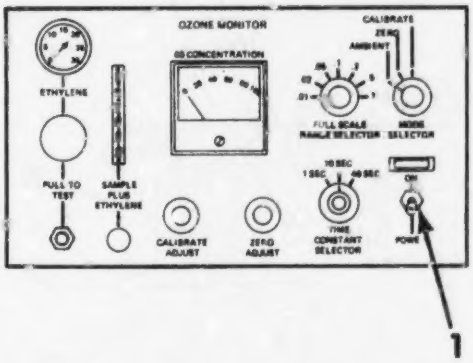
30. If servicing MOD C, go to step 66.

31. Set POWER switch (1) to OFF.

32. Remove four screws (5) and top cover (4).

CAUTION

To avoid damage to fittings in monitor, teflon fittings should be tightened finger tight. Metal fittings should be tightened finger tight plus 3/4 turn with a wrench.


OZONE MONITOR
O3 CONCENTRATION
0
20
40
60
80
100
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
.01
.02
.05
.1
.2
.5
1
FULL SCALE RANGE SELECTOR
CALIBRATE
ZERO
AMBIENT
MODE SELECTOR
1 SEC
10 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
1

33. Check that fittings between SAMPLE INLET fitting (11) and solenoid valve (7) are tight. If not, tighten any loose fittings. Reinstall top cover and go to step 1.

34. Disconnect exhaust tubing (10) from pump (14).

35. Disconnect inlet tubing (6) from pump (14).

36. Connect inlet tubing (6) to pump exhaust outlet (13).

NOTE

If inlet tubing will not reach pump exhaust outlet, replace tubing with an 18" length of vinyl tubing.

WARNING

Use extreme caution when performing check. Power is applied to the monitor and electric shock is possible during this procedure.

37. Set POWER switch (1) to ON.

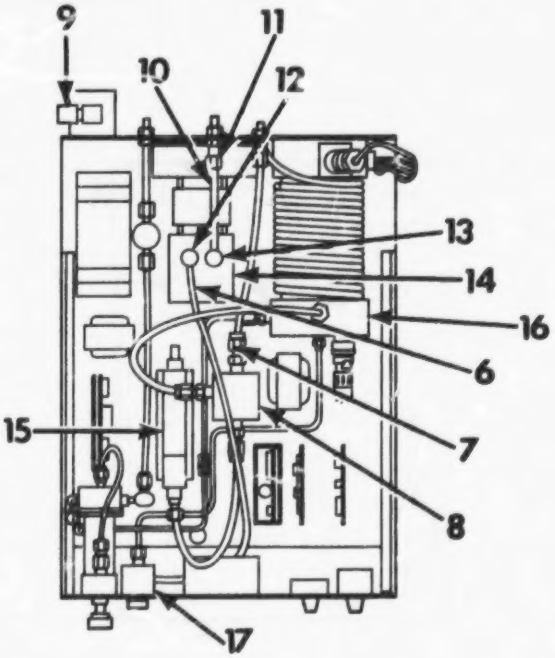
38. Seal off air flow at SAMPLE INLET fitting (2).

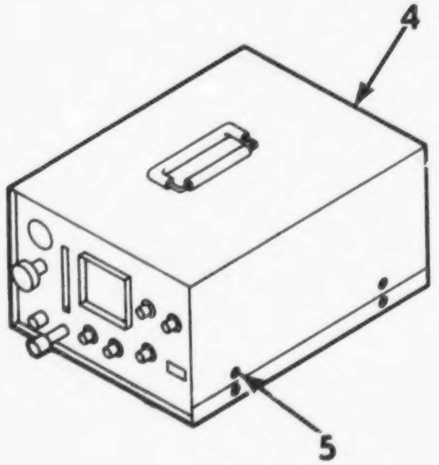
39. Apply Liquid Leak Detector solution to each fitting between SAMPLE INLET fitting (11) and solenoid valve (7).

40. Check that bubbles do not appear on any fittings. If bubbles appear, repair or replace defective fitting and go to step 84.

41. Set POWER switch (1) to OFF.

42. Replace Selector Solenoid Valve (8).





43. Disconnect inlet tubing (3) to pump inlet (4).

42. Set POWER switch (1) to OFF.

43. Disconnect inlet tubing (3) from pump exhaust outlet (2).

44. Connect inlet tubing (3) to pump inlet (4).

NOTE

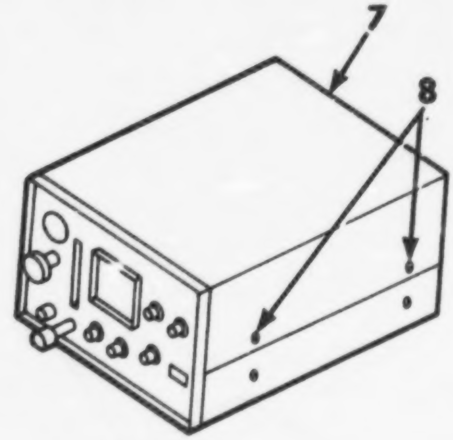
If an 18" length of vinyl tubing was substituted in step 36, reconnect the original tubing at this time.

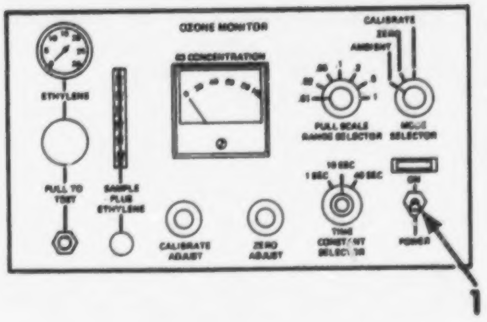
45. Connect exhaust tubing (5) to pump exhaust outlet (2).

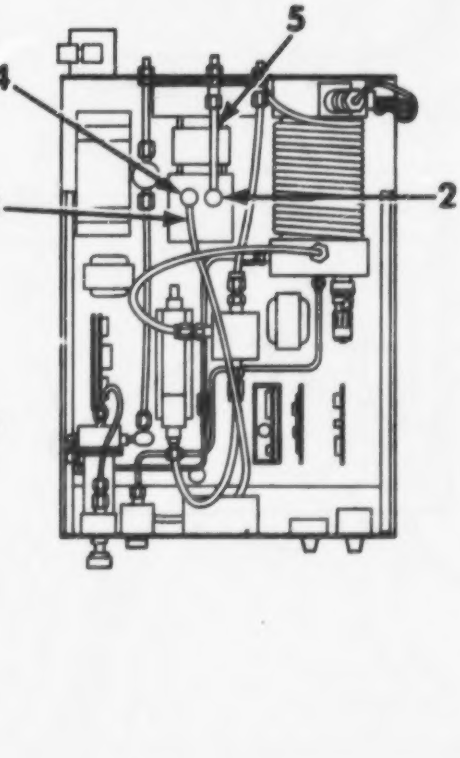
46. Reinstall top cover and secure with screws.

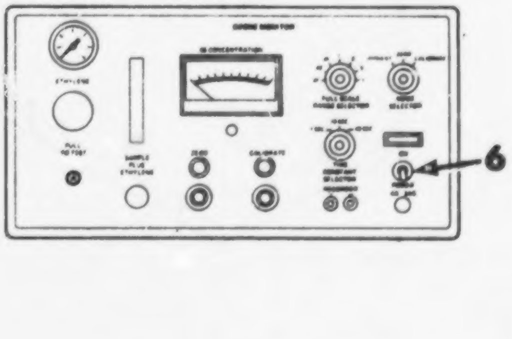
47. Go to step 1.

48. Set POWER switch (6) to OFF.




OZONE MONITOR
O3 CONCENTRATION
ETHYLENE
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
CALIBRATE
ZERO
AMBIENT
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
40 SEC
TIME CONSTANT SELECTOR
ON
POWER
1





49. Remove four screws (8) and top cover (7).

CAUTION

To avoid damage to fittings in monitor, teflon fittings should be tightened finger tight. Metal fittings should be tightened finger tight plus 3/4 turn with a wrench.

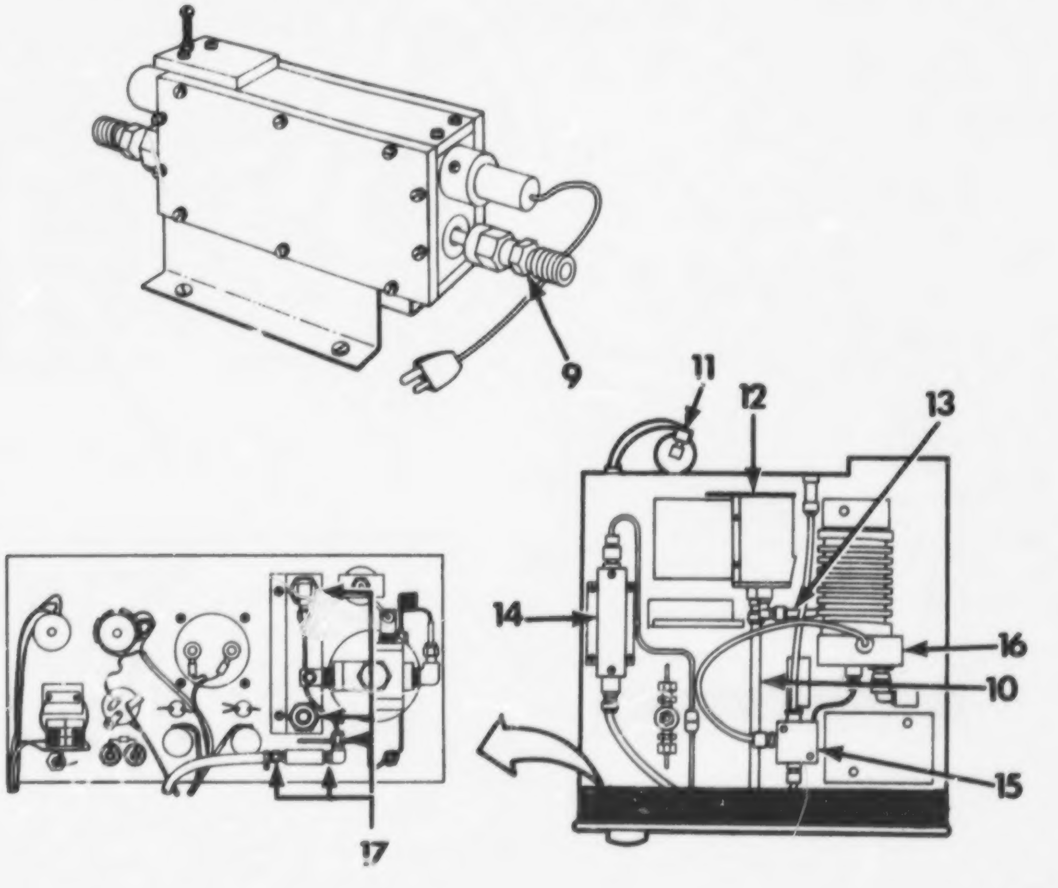
CAUTION

Be extremely careful when repairing fittings on quartz tube (9). The quartz tube is very fragile and easily broken.

50. Check that all fittings on the calibration sample filter (11) ozone generator (14) selector solenoid (15) reaction chamber (16) flow gauge/needle valve assembly (17) and evacuation pump (12) are tight. If not, tighten any loose fittings, reinstall top cover, and go to step 1.

51. Disconnect exhaust tubing (13) from pump (12).

52. Disconnect inlet tubing (10) from pump (12).



53. Connect 8" length of teflon tubing to pump exhaust fitting (9).

54. Connect other end of tubing to fitting on inlet tubing (4).

WARNING

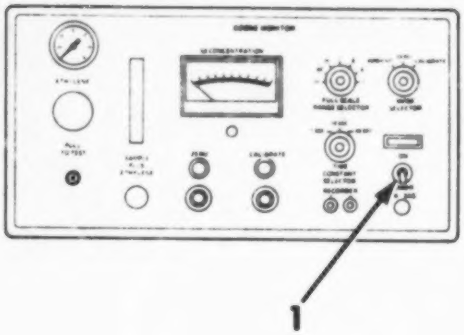
Use extreme caution when performing check. Power is applied to the monitor and electric shock is possible during this procedure.

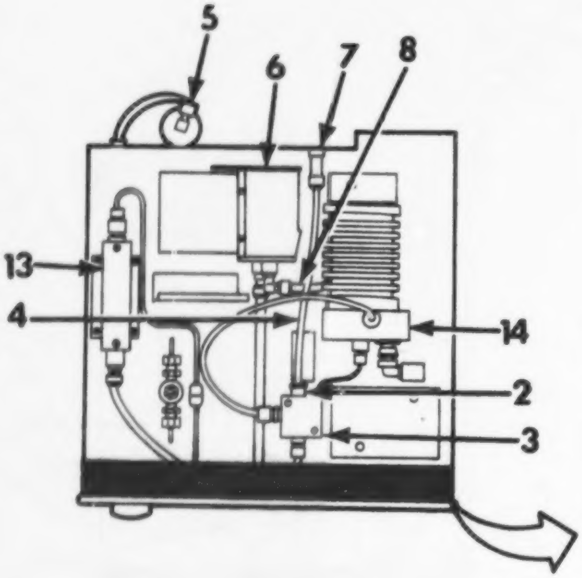
55. Set POWER switch (1) to ON.

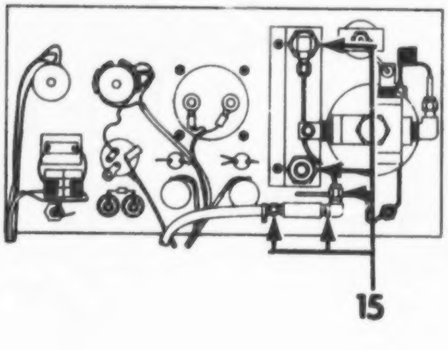
56. Seal off air flow at Calibration Sample Filter inlet (5).

57. Apply liquid leak detector solution to each fitting of the calibration sample filter (5), ozone generator (13), selector solenoid (3), reaction chamber (14), flow gauge/needle valve assembly (15), and evacuation pump (6).

58. Check that bubbles do not appear on any fittings. If bubbles appear, repair or replace defective fitting and go to step 90.







59. Set POWER switch (1) to OFF.

60. Replace Selector Solenoid Valve (3).

61. Disconnect 8" teflon tubing from pump (6) and inlet tubing (4).

62. Connect inlet tubing (4) to pump inlet (10).

63. Connect exhaust tubing (8) to pump exhaust outlet (9).

64. Reinstall top cover and secure with screws.

65. Go to step 1.

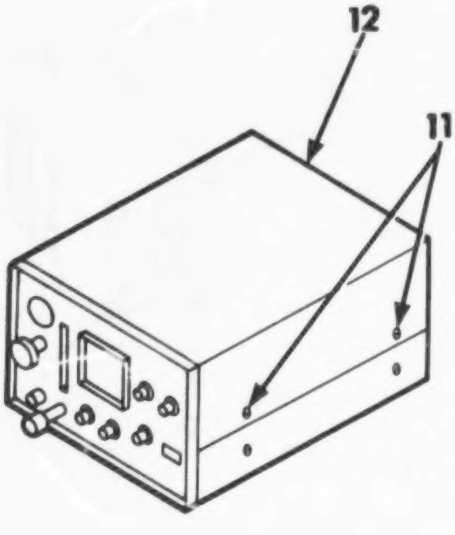
66. Set POWER switch (1) to OFF.

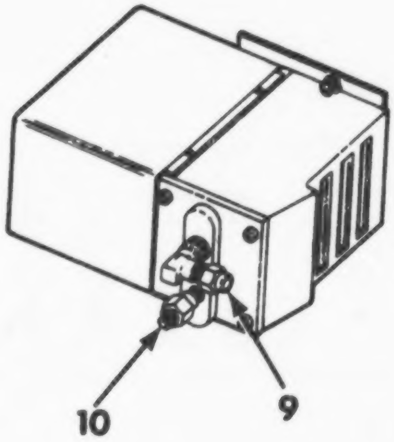
67. Remove four screws (11) and top cover (12).

CAUTION

To avoid damage to fittings in monitor, teflon fittings should be tightened finger tight. Metal fittings should be tightened finger tight plus 3/4 turn with a wrench.

68. Check that fittings between SAMPLE INLET FITTING (7) and solenoid valve (2) are tight. If not, tighten any loose fittings, reinstall top cover, and go to step 1.





71. Connect 8" teflon tubing to pump exhaust fitting (1).

72. Connect other end of tubing to fitting on inlet tubing (6).

WARNING

Use extreme caution when performing check. Power is applied to the monitor and electric shock is possible during this procedure.

73. Set POWER switch (3) to ON.

74. Seal off air flow at SAMPLE INLET fitting (9).

75. Apply Liquid Leak Detector solution to each fitting between SAMPLE INLET fitting (9) and SELECTOR SOLENIOD VALVE (4).

76. Check that bubbles do not appear on any fittings. If bubbles appear, repair or replace defective fitting and go to step 90.

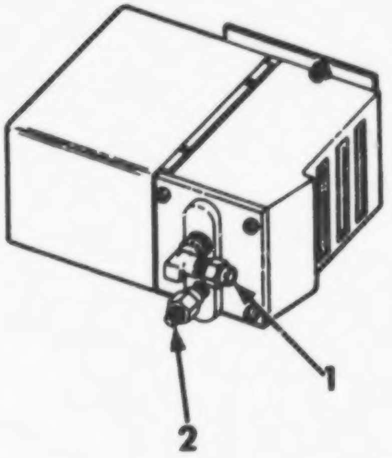
77. Set POWER switch (3) to OFF.

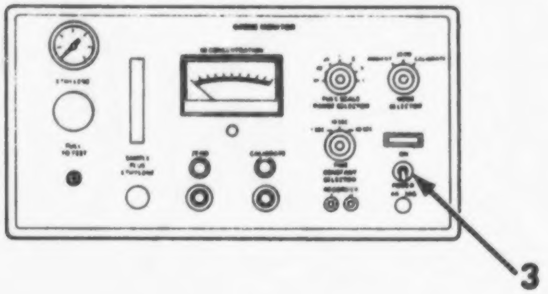
78. Replace Selector Solenoid Valve (5).

79. Disconnect 8" teflon tubing from pump (8) and inlet tubing (6).

80. Connect inlet tubing (6) to pump inlet (2).

81. Connect exhaust tubing (10) to pump exhaust outlet (1).





82. Reinstall top cover and secure with screws.

83. Go to step 1.

84. Set POWER switch (11) to OFF.

85. Disconnect inlet tubing (13) from pump exhaust outlet (12).

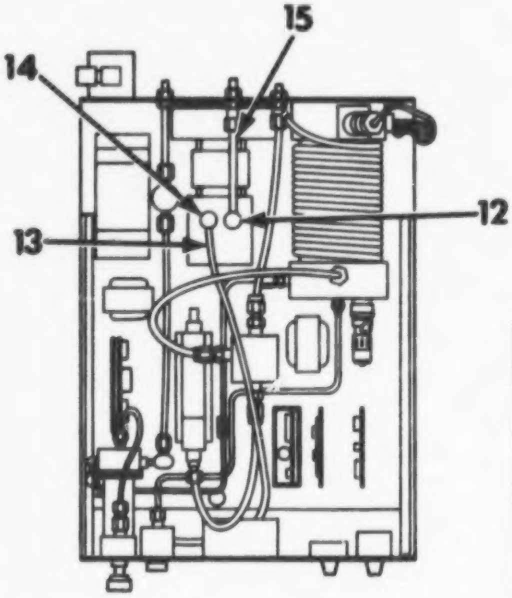
86. Connect inlet tubing (13) to pump inlet (14).

NOTE

If an 18" length of vinyl tubing was substitued in step 36, reconnect the original tubing at this time.

87. Connect exhaust tubing (15) to pump exhaust outlet (12).

88. Reinstall top cover and secure with screws.



89. Go to step 1.

90. Set POWER switch (3) to OFF.

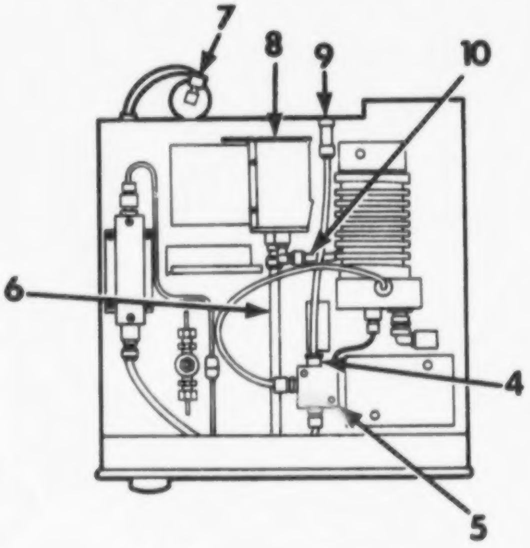
91. Disconnect 8" teflon tubing from pump (8) and inlet tubing (6).

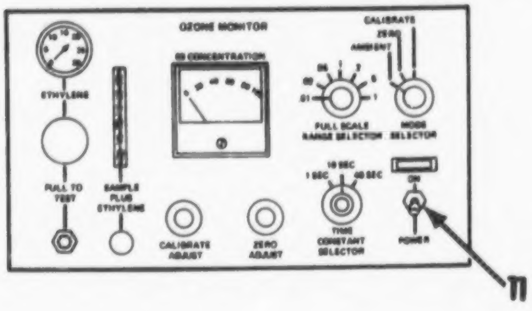
92. Connect inlet tubing (6) to pump inlet (2).

93. Connect exhaust tubing (10) to pump exhaust outlet (1).

94. Reinstall top cover and secure wit screws.

95. Go to step 1.




OZONE MONITOR
CALIBRATE
ZERO
AMBIENT
O3 CONCENTRATION
ETHYLENE
FULL SCALE RANGE SELECTOR
MODE SELECTOR
10 SEC
1 SEC
60 SEC
ON
PULL TO TEST
SAMPLE PLUS ETHYLENE
CALIBRATE ADJUST
ZERO ADJUST
TIME CONSTANT SELECTOR
POWER
11

SCHEMATICS

Introduction

The pages which follow contain Electronic Schematic diagrams for Mods A, B, and C.

Activity Index

Schematic	Page
Mod A and B	8-3
Mod C	8-5
Mod C - Printed circuit board schematics begin	8-7

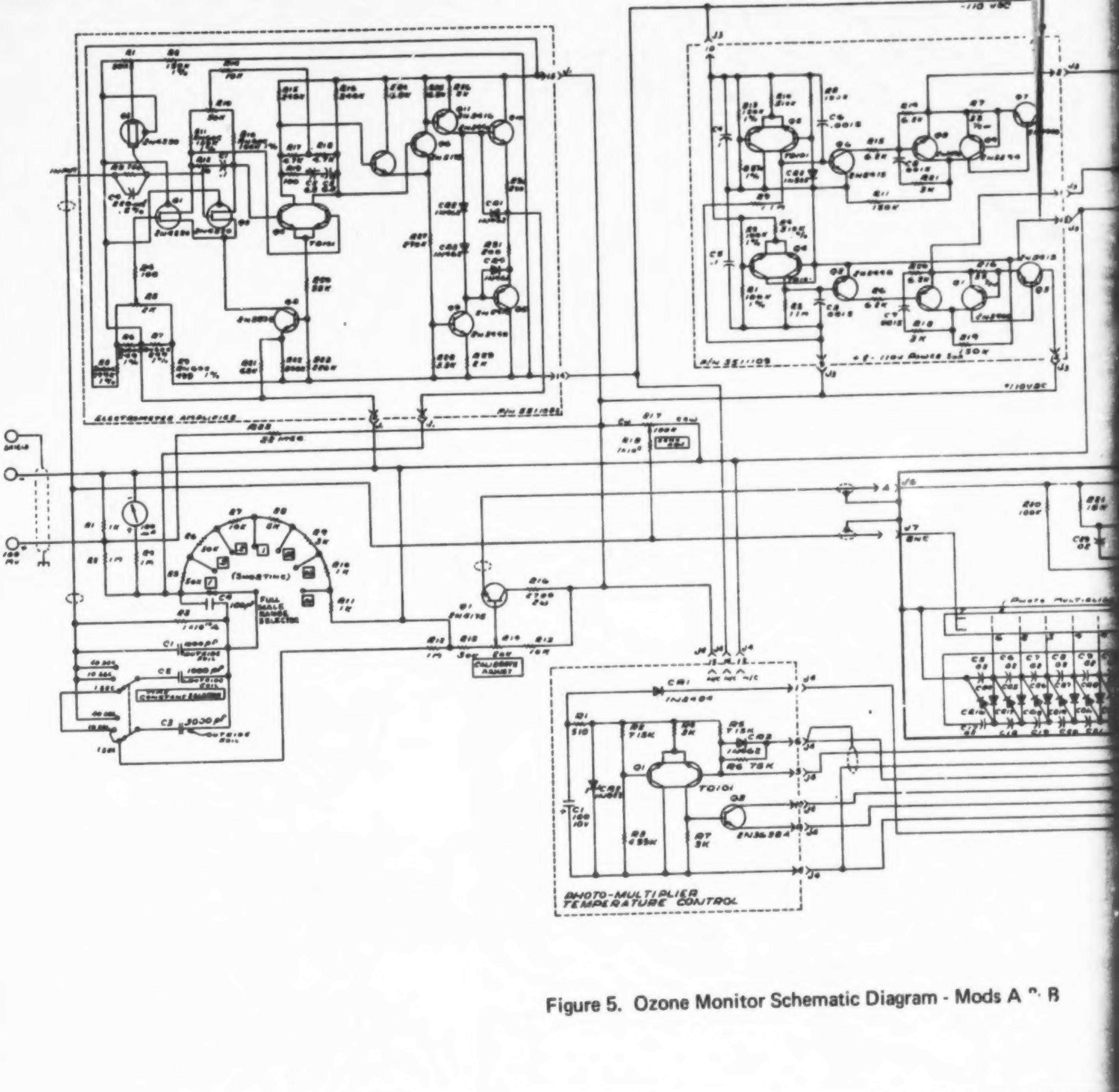
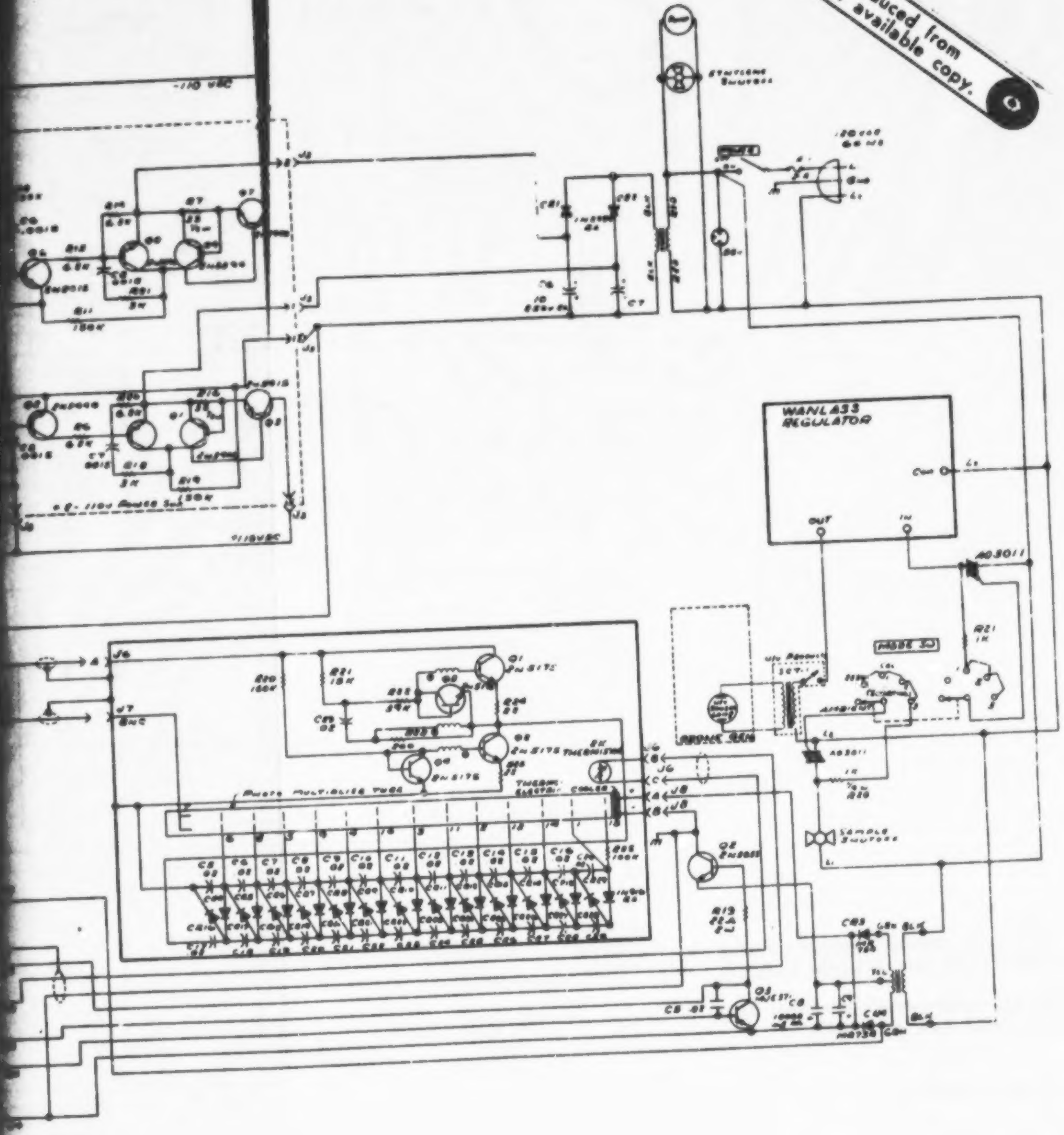

ELECTROMETER AMPLIFIER
P/N 551102
-110 VDC
+110 VDC
P/N 551105
+ & -110V POWER SUP.
INPUT
FULL SCALE RANGE SELECTOR
(SHORTING)
TIME CONSTANT SWITCH
CALIBRATE ADJUST
OUTSIDE COIL
PHOTO-MULTIPLIER TEMPERATURE CONTROL
1N4004
TO101
2N3638A

Figure 5. Ozone Monitor Schematic Diagram - Mods A & B

Reproduced from best available copy.


-110 VDC
+110VDC
STATIONARY SHUTTER
WANLASS REGULATOR
COM
OUT
IN
AO3011
R21
1K
MODE SW
SAMPLE SHUTTER
PHOTO MULTIPLIER TUBE
THERMISTOR
THERMO-ELECTRIC COOLER
2N5175
J6
J7
J8
BNC
R13
CR3
Q3
C8
C9
BLK

matic Diagram - Mods A & B

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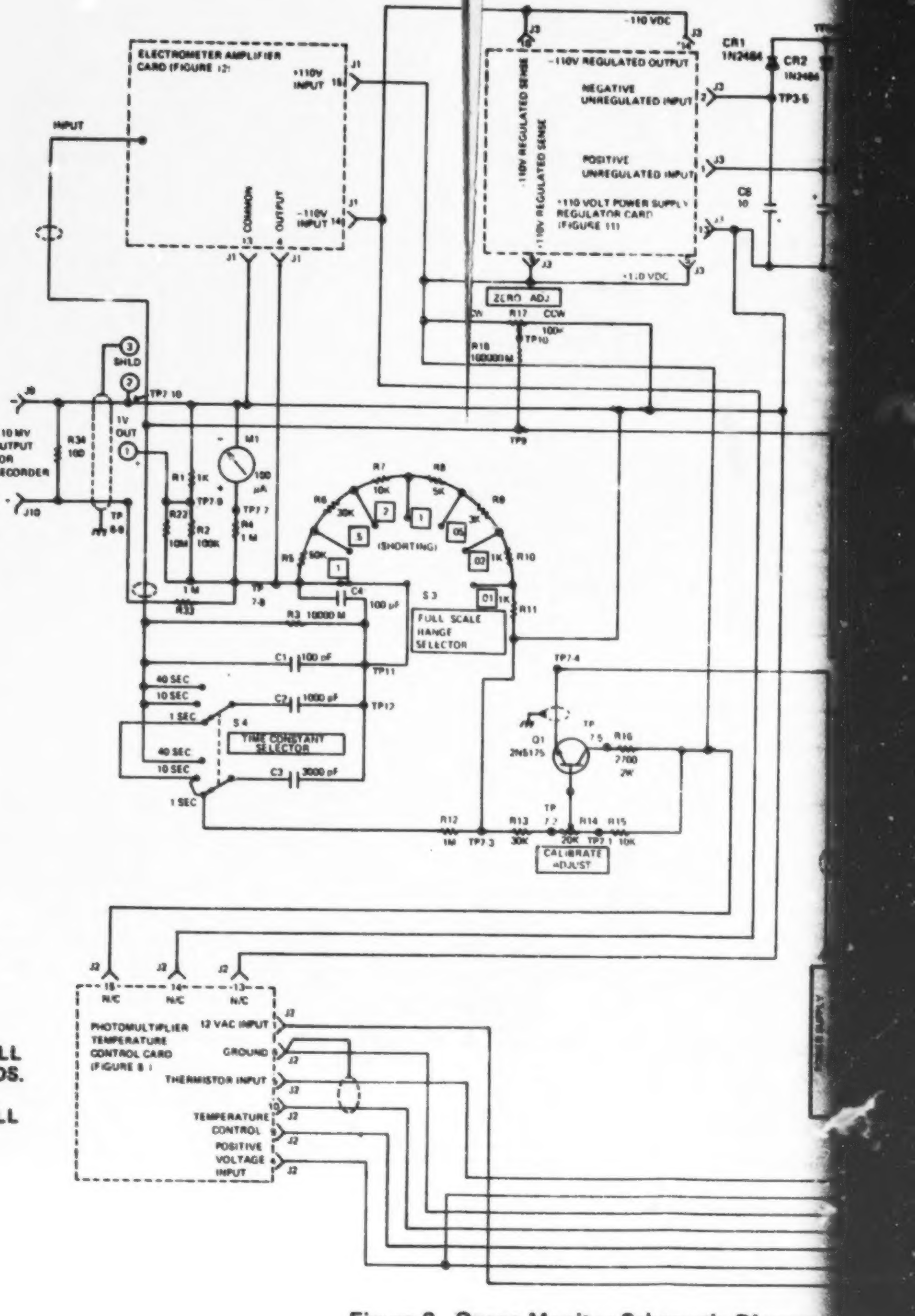
ELECTROMETER AMPLIFIER CARD (FIGURE 12)
+110V INPUT 15
J1
-110V INPUT 14
COMMON 13
OUTPUT 4
INPUT
-110 VDC
J3
CR1 1N2484
CR2 1N2484
-110V REGULATED OUTPUT
NEGATIVE UNREGULATED INPUT
TP3-5
-110V REGULATED SENSE
+110V REGULATED SENSE
POSITIVE UNREGULATED INPUT
+110 VOLT POWER SUPPLY REGULATOR CARD (FIGURE 11)
C6 10
+110 VDC
ZERO ADJ
CW
R17
CCW
100K
TP10
R18 100000 M
TP9
SHLD
TP7 10
J9
J10
0-10 MV OUTPUT FOR RECORDER
R34 100
1V OUT
TP 6-8
M1
100 µA
R1 1K
TP7 9
R22 10M
R2 100K
TP7 7
R4 1 M
R33 1 M
TP 7-8
R5 50K
R6 30K
R7 10K
R8 5K
R9 3K
R10 1K
R11 1K
(SHORTING)
C4 100 pF
S3
FULL SCALE RANGE SELECTOR
R3 10000 M
C1 100 pF
TP11
C2 1000 pF
TP12
40 SEC
10 SEC
1 SEC
S4
TIME CONSTANT SELECTOR
C3 3000 pF
TP7 4
Q1 2N5175
TP 7 5
R16 2700 2W
R12 1M
TP7 3
R13 30K
TP 7 2
R14 20K
TP7 1
R15 10K
CALIBRATE ADJUST
J2
N/C
PHOTOMULTIPLIER TEMPERATURE CONTROL CARD (FIGURE 8)
12 VAC INPUT
GROUND
THERMISTOR INPUT
TEMPERATURE CONTROL
POSITIVE VOLTAGE INPUT

NOTES:

A. UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE IN MICROFARADS.

B. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS.

*EXTERNAL JUMPER

Figure 6. Ozone Monitor Schematic Diagram

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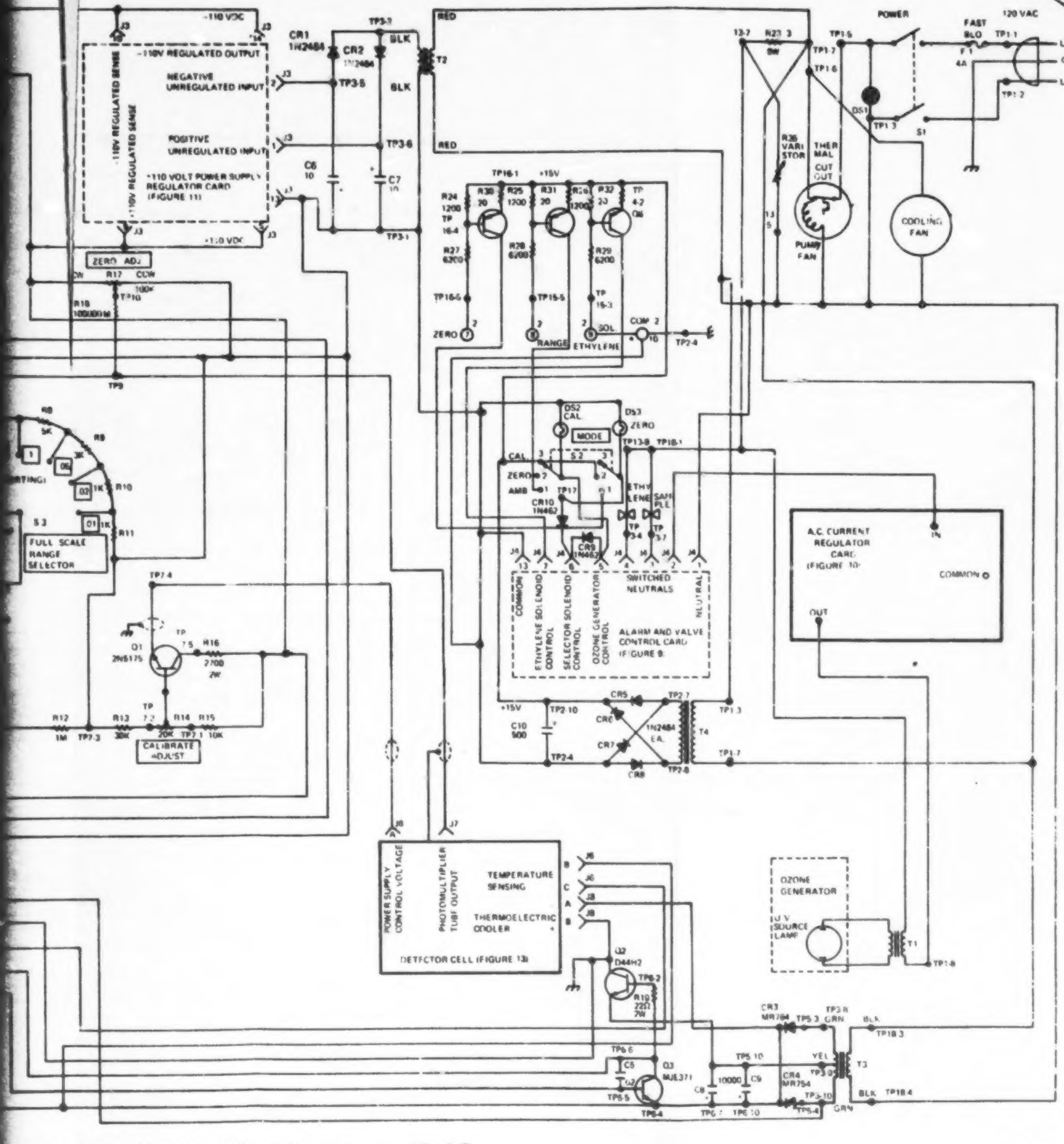
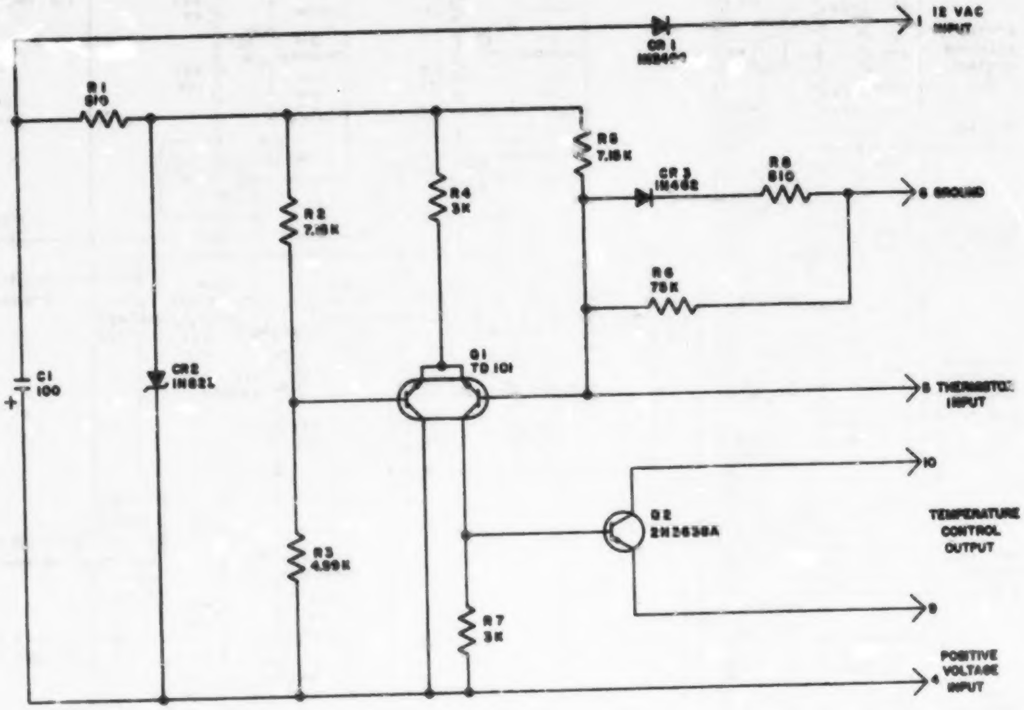


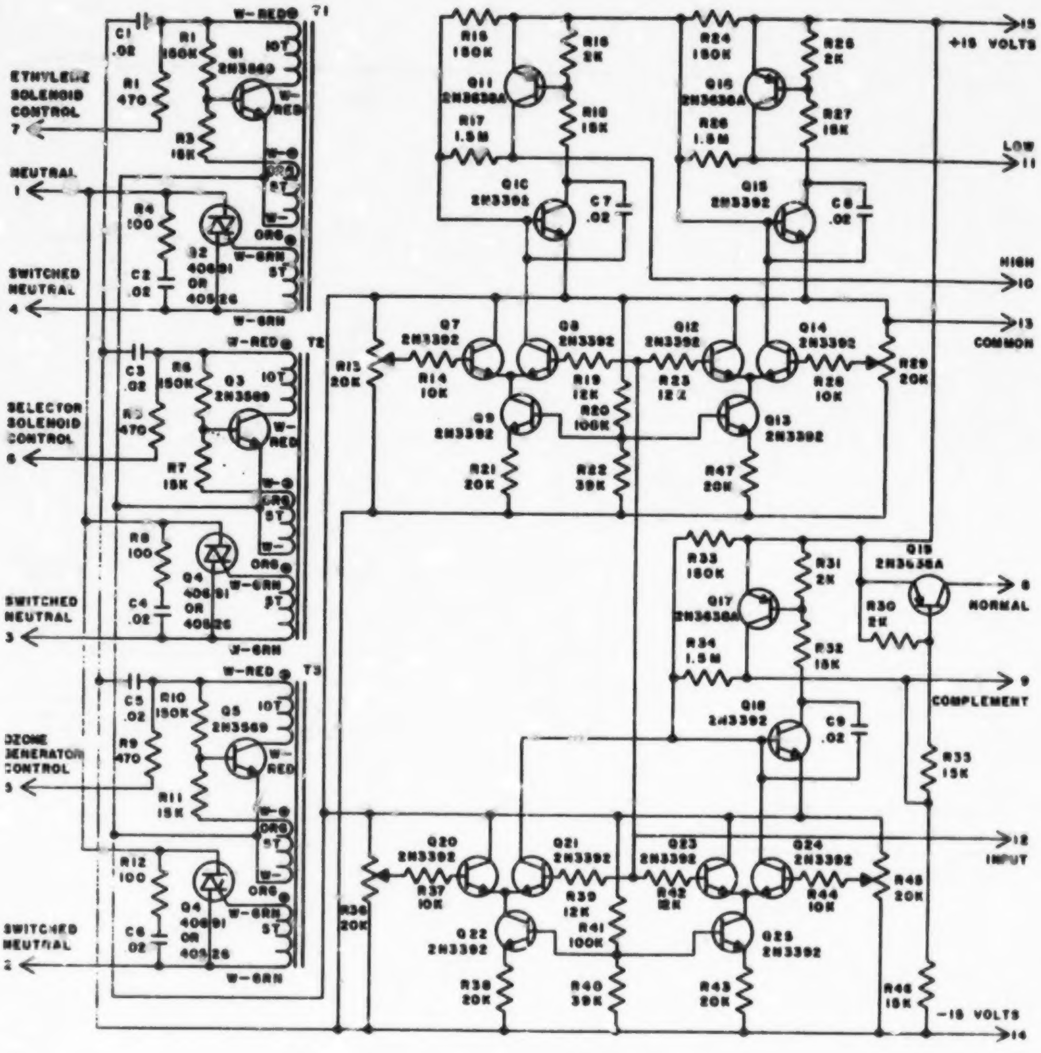
-110 VDC
J3
-110V REGULATED OUTPUT
NEGATIVE UNREGULATED INPUT
POSITIVE UNREGULATED INPUT
+110 VOLT POWER SUPPLY REGULATOR CARD (FIGURE 11)
-110V REGULATED SENSE
+110V REGULATED SENSE
+110 VDC
CR1 1N2484
CR2 1N2484
TP3-5
TP3-6
TP3-1
C6 10
C7 10
BLK
RED
T2
ZERO ADJ
R17
CW
CCW
TP10
R18
TP9
TP16-1
+15V
R24 1200
R30 20
R25 1200
R31 20
R26 1200
R32 20
R27 6200
R28 6200
R29 6200
TP16-5
TP15-5
ZERO
RANGE
ETHYLENE
COM
SOL
TP2-4
DS2 CAL
DS3 ZERO
MODE
S2
CAL
ZERO
AMB
TP17
CR10 1N462
CR9 1N462
ETHYLENE
SAMPLE
TP13-8
TP18-1
COMMON
ETHYLENE SOLENOID CONTROL
SELECTOR SOLENOID CONTROL
OZONE GENERATOR CONTROL
SWITCHED NEUTRALS
NEUTRAL
ALARM AND VALVE CONTROL CARD (FIGURE 9)
J4
J5
+15V
C10 500
TP2-10
TP2-4
CR5
CR6
CR7
CR8
1N2484 EA.
TP2-7
TP2-8
T4
TP1-3
TP1-7
R8 5K
R9 3K
R10 1K
R11 1K
S3
FULL SCALE RANGE SELECTOR
TP7-4
Q1 2N5175
TP 7.5
R16 2700 2W
R12 1M
TP7-3
R13 30K
TP 7.2
R14 20K
R15 10K
TP7.1
CALIBRATE ADJUST
J6
J7
J8
POWER SUPPLY CONTROL VOLTAGE
PHOTOMULTIPLIER TUBE OUTPUT
TEMPERATURE SENSING
THERMOELECTRIC COOLER
DETECTOR CELL (FIGURE 13)
Q2 D44H2
TP8-2
R19 22Ω 7W
TP6-6
C5
C2
TP5-5
Q3 MJE371
TP8-4
C8
10000
C9
TP5-10
TP6-10
CR3 MR754
TP5-3
CR4 MR754
TP5-4
TP3-8 GRN
YEL
BLK
GRN
T3
TP18-3
TP18-4
OZONE GENERATOR
U.V. SOURCE LAMP
T1
TP1-8
A.C. CURRENT REGULATOR CARD (FIGURE 10)
IN
OUT
COMMON
13-7
R23 3 5W
TP1-2
TP1-6
TP1-5
R36 VARISTOR
THERMAL CUT OUT
PUMP FAN
DS1
TP1-3
COOLING FAN
POWER
S1
FAST BLO F1 4A
120 VAC
TP1-1
TP1-2
L1
GND
L2

ure 6. Ozone Monitor Schematic Diagram - Mod C


12 VAC INPUT
1
CR1
1N540
R1
510
R5
7.15K
CR3
1N462
R8
510
6 GROUND
R4
3K
R2
7.15K
R6
75K
Q1
TD 101
C1
100
+
CR2
1N821
5 THERMISTOR INPUT
10
Q2
2N2638A
TEMPERATURE CONTROL OUTPUT
9
R3
4.99K
R7
3K
4
POSITIVE VOLTAGE INPUT

NOTE
1. UNLESS OTHERWISE SPECIFIED—
(A) ALL RESISTOR VALUES ARE IN OHMS.
(B) ALL CAPACITOR VALUE ARE IN MICROFARADS.

Figure 7. Photomultiplier Temperature Control Card Schematic - Mod C

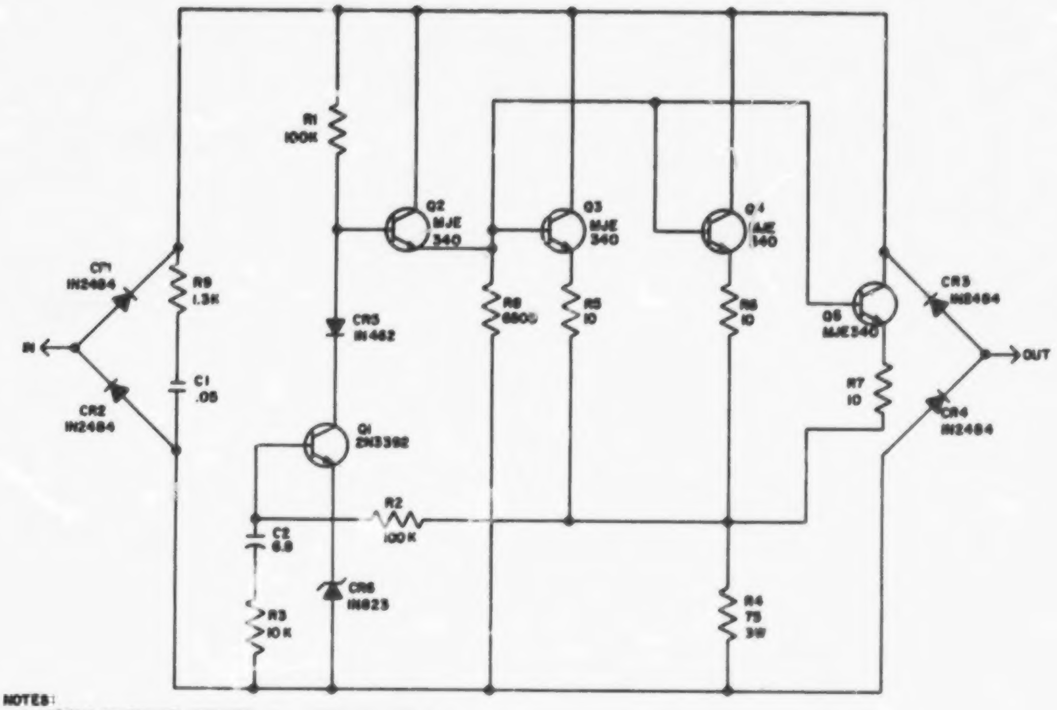

ETHYLENE SOLENOID CONTROL 7
NEUTRAL 1
SWITCHED NEUTRAL 4
SELECTOR SOLENOID CONTROL 6
SWITCHED NEUTRAL 3
OZONE GENERATOR CONTROL 5
SWITCHED NEUTRAL 2
C1 .02
R1 150K
R1 470
Q1 2N3569
R3 15K
W-RED T1
IOT
W-RED
W-O
ORG
ST
W-
ORG
W-GRN
ST
W-GRN
R4 100
Q2 40691 OR 40526
C2 .02
C3 .02
R6 150K
Q3 2N3569
R5 470
R7 15K
W-RED T2
R8 100
Q4 40691 OR 40526
C4 .02
W-GRN
C5 .02
R10 150K
Q5 2N3569
R9 470
R11 15K
W-RED T3
R12 100
Q4 40691 OR 40526
C6 .02
W-GRN
R15 150K
R16 2K
Q11 2N3638A
R18 15K
R17 1.5M
Q10 2N3392
C7 .02
R24 150K
R25 2K
Q16 2N3638A
R27 15K
R26 1.5M
Q15 2N3392
C8 .02
15 +15 VOLTS
LOW 11
HIGH 10
13 COMMON
Q7 2N3392
Q8 2N3392
Q12 2N3392
Q14 2N3392
R13 20K
R14 10K
R19 12K
R20 100K
R23 12K
R28 10K
R29 20K
Q9 2N3392
Q13 2N3392
R21 20K
R22 39K
R47 20K
R33 150K
R31 2K
Q19 2N3638A
Q17 2N3638A
R30 2K
8 NORMAL
R34 1.5M
R32 15K
9 COMPLEMENT
Q18 2N3392
C9 .02
R33 15K
12 INPUT
Q20 2N3392
Q21 2N3392
Q23 2N3392
Q24 2N3392
R36 20K
R37 10K
R39 12K
R42 12K
R44 10K
R45 20K
Q22 2N3392
R41 100K
Q25 2N3392
R38 20K
R40 39K
R43 20K
R46 15K
-15 VOLTS 14

NOTES

A — UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE IN MICROFARADS.

B — UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS.

Figure 8. Alarm and Valve Control Card Schematic Diagram - Mod C

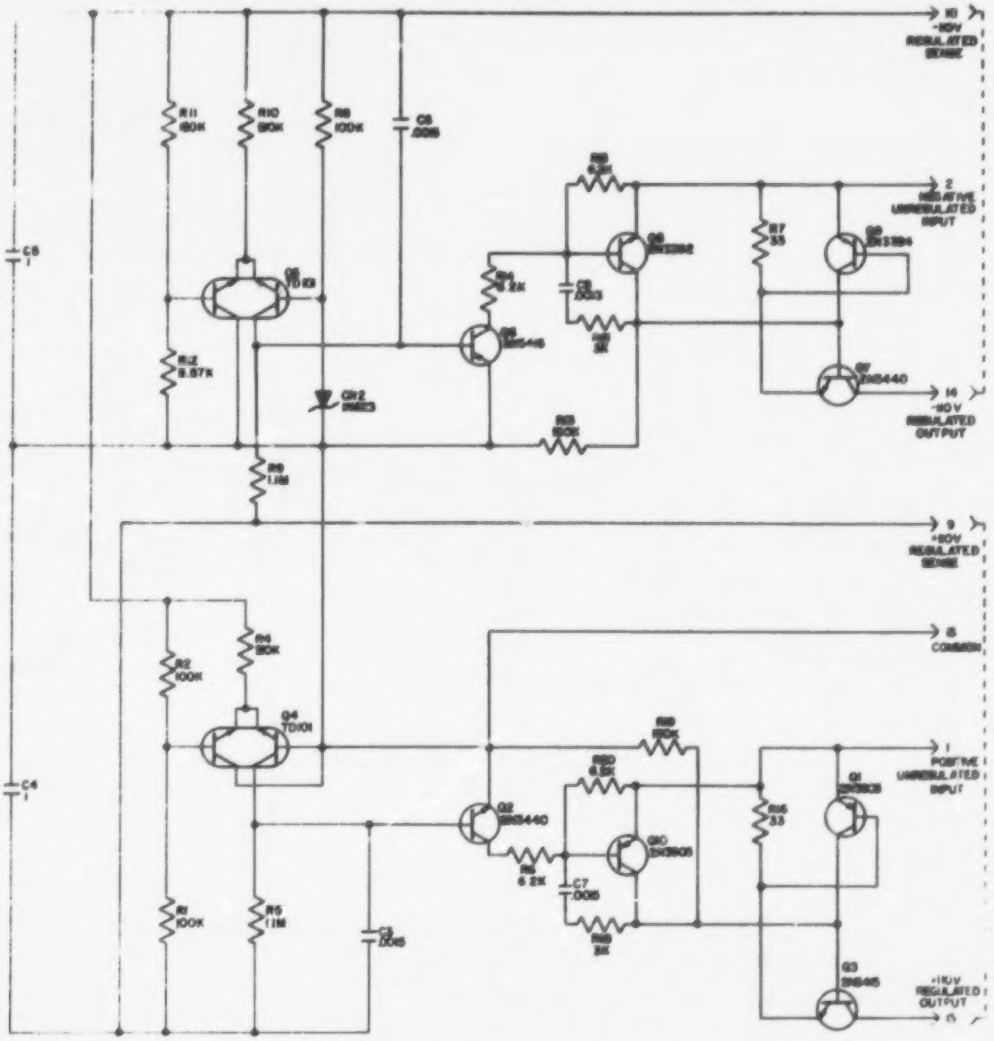

IN
CR1
IN2484
CR2
IN2484
R9
1.3K
C1
.05
R1
100K
Q2
MJE
340
CR5
IN462
Q1
2N3392
R2
100K
C2
6.8
R3
10K
CR6
IN823
R8
6800
Q3
MJE
340
R5
10
Q4
MJE
340
R6
10
R4
75
3W
Q5
MJE340
R7
10
CR3
IN2484
CR4
IN2484
OUT

NOTES:

A- UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE IN MICROFARADS.

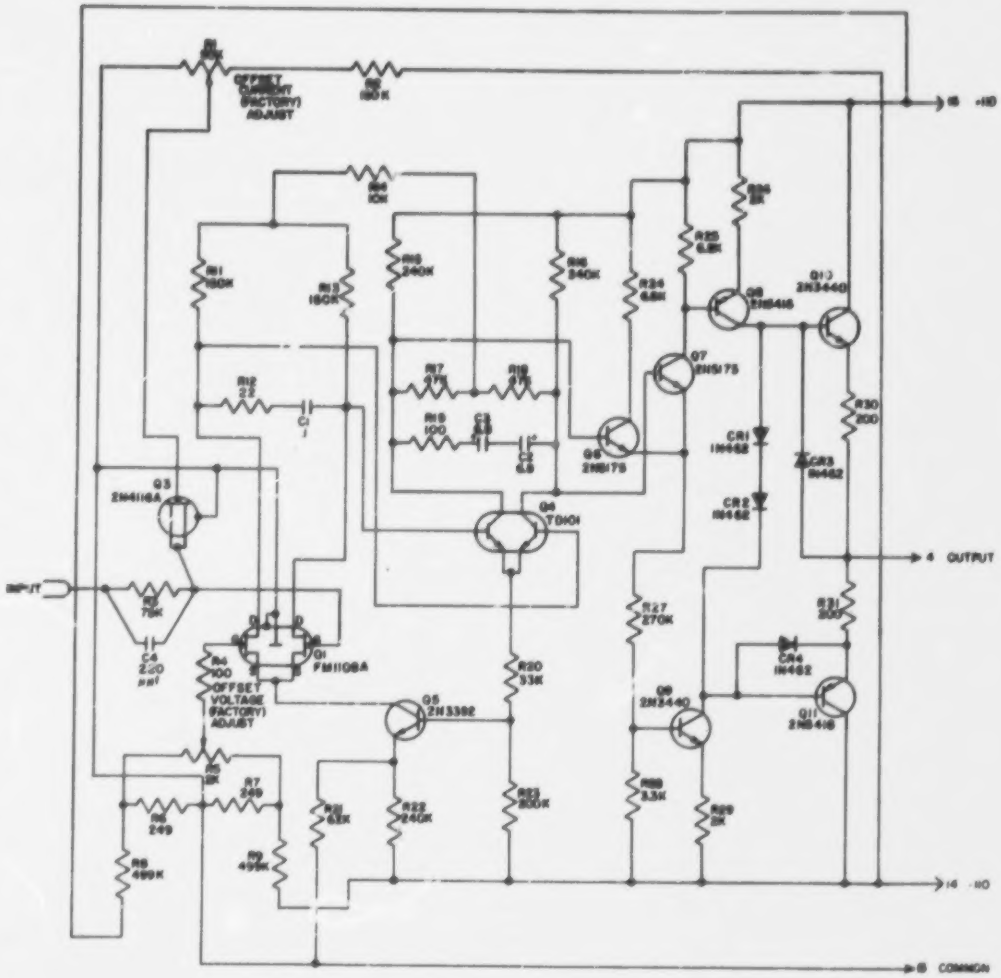
B- UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS.

Figure 9. AC Current Regulator Card Diagram - Mod C


R11
R10
R8
100K
C5
R12
R9
1.1M
CR2
C6
1
Q6
TD101
C8
R7
33
Q7
R13
10
-110V
REGULATED
SENSE
2
NEGATIVE
UNREGULATED
INPUT
14
-110 V
REGULATED
OUTPUT
9
+110V
REGULATED
SENSE
8
COMMON
R2
100K
Q4
TD101
R1
100K
R5
1.1M
Q2
2N3440
6.2K
C7
.0015
Q10
R16
33
Q1
1
POSITIVE
UNREGULATED
INPUT
Q3
+110V
REGULATED
OUTPUT
C4
1

NOTES
A UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE IN MICROFARADS
B UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS

Figure 10. ± 110 Volt Power Supply Regulator Card Schematic - Mod C


R1
OFFSET CURRENT (FACTORY) ADJUST
R2
180K
R14
10K
R11
180K
R13
180K
R15
240K
R16
240K
R24
6.8K
R25
6.8K
R26
2K
Q10
2N3440
Q8
2N5416
Q7
2N5175
R17
R18
R12
22
C1
1
R19
100
C3
C2
6.8
Q6
2N5175
CR1
1N462
CR3
1N462
CR2
1N462
R30
200
Q3
2N4116A
Q4
TD101
INPUT
R3
75K
C4
220
μμf
Q1
FM1108A
R4
100
OFFSET VOLTAGE (FACTORY) ADJUST
Q5
2N3392
R20
33K
R27
270K
R31
200
CR4
1N462
Q9
2N3440
Q11
2N5416
R5
2K
R7
249
R6
249
R8
499K
R9
499K
R21
6.2K
R22
240K
R23
200K
R28
3.3K
R29
2K
16 +10
4 OUTPUT
14 -10
8 COMMON

NOTES
A-UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE IN MICROFARADS
B-UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE IN OHMS

Figure 11. Electrometer Amplifier Card Schematic Diagram - Mod C

SUPPORTING EQUIPMENT

Introduction

The items of support equipment required for the Ozone Monitor are described below. The items are grouped according to support subsystems. Those items which are supplied with the Monitor are so noted.

Ethylene Delivery Subsystem

Ethylene, CP Grade, in high pressure cylinder.

Ethylene Regulator, two-stage, Harris Model 92-100A or equivalent.

Tubing, stainless steel, 1/8 O.D., 10 ft. (SUPPLIED).

Orifice, ethylene, part number A4334 (SUPPLIED).

Connector, 1/8" tubing to 1/4" FPT, part number 005364-22 (SUPPLIED).

External Ozone Generator Subsystem

Either:

Air Lab grade, in high pressure cylinder.

Air Regulator, two stage, CGA540.

OR

Air pump, laboratory type Fisher Scientific Model 1-093 or equivalent.

Filter, activated charcoal/indicating silica gel/molecular sieve.

Needle valve, with hose fittings, Hoke Co. Model 4RB286 or equivalent.

Flowmeter (with calibration curve), capable of measuring airflow in the range of 2-15 l/minute within ± 5%.

Ozone Generator. The ozone generator should conform to the design as described in Technical Note 585, National Bureau of Standards January, 1971. Government Printing Office Catalog No. C13.46:585.

Manifold, glass, one inlet, minimum of three outlets, 1" O.D., 1/4" inlet/outlets.

Chart Recorder Subsystem

Chart Recorder, single channel, giving full scale response at 100mV.

Cable, signal, 8' long, part number 551443 (SUPPLIED).

Sample Input/Exhaust

Tubing, 1/4" O.D., teflon, 10' long, (SUPPLIED).

Filter, teflon, part number 007163, (SUPPLIED).

Elements, teflon filter, 1 package, part number 007230 (SUPPLIED).

Tubing, Plastic 10' long part number 45077-5, (SUPPLIED).

Sampling Train

Absorbers. Kontes Glass Co. Model No. 24/40. or equivalent, 2 required.

Trap, Fisher Scientific Model No. 10-180 or equivalent, loosely filled with glass wool.

Flowmeter (with calibration curve) capable of measuring sample flow in the 0-1 l/minute range within ± 2.

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Needle valve, with hose fittings, Hoke Co. Model No. 4RB286 or equivalent.

Air pump, laboratory type, capable of drawing 1 l/m through the absorbers, Fisher Scientific Model No. 1-093, or equivalent.

Pipette, 10 ml capacity, Fisher Scientific Model No. 13-650 L, or equivalent.

Spectrophotometer, capable of measuring absorbance at 352 NM.

Spectrophotometer cells, matched pair, suitable to the spectrophotometer in use at 352 nm.

General

Data Sheet (SUPPLIED).

Fuse, 4 amp, 3AG part number 42982 (SUPPLIED).

Bubblemeter Kit, part number 5511183-1.

Timer, capable of reading to the nearest second.

Tubing, thick walled, rubber 1/4" ID, 10", Fisher Scientific No. 14-178-5D or equivalent.

Utility stands, Fisher Scientific Model No. 14-675, or equivalent, four required.

Utility stand clamps, Fisher Scientific Model No. 5-766 or equivalent, six required.

PRIMARY CALIBRATION

Discussion

The Federal Register (1) specified the neutral buffered potassium iodide (KI) method (2, 4) as a method to be employed in the primary calibration of the ozone monitor. The Environmental Protection Agency has published guidelines (3) for using the KI method in a primary multipoint calibration procedure. This procedure involves the use of the external ozone generator to produce ozone at about 0, 10, 20, 40, and 80 percent of the ozone monitor full scale capacity. The monitor and the KI sampling train tap from a manifold at the output side of the generator and ozone concentration is measured for each of the five points by bubbling the sample through KI absorbing reagent and reading the absorbance of the exposed reagent using a spectophotometer. Calibration curves are then prepared for both the external ozone generator and the ozone monitor. The check of the external ozone generator, page 3-3, employs the KI sampling train and a simplified version of the KI reference method.

Primary Multipoint Calibration is required when:

1. The monitor is first purchased.
2. The monitor has undergone maintenance which might affect response characteristics.
3. The monitor has been moved to a site where ambient atmospheric pressure is significantly different from the ambient pressure at the calibration site.
4. An audit indicates that the monitor does not meet desired performance standards.

It is recommended that at least five primary calibrations be performed, over a period of at least two weeks. The data from these calibrations should then be used to construct an average calibration curve for the ozone generator and the monitor. Primary calibration of this Ozone Monitor should be performed only by a chemist or qualified chemical technician.

Following Primary Multipoint Calibration (as occasioned by any of the above reasons), routine calibrations can be performed by following the calibration procedure, page for secondary calibration, and the procedure on page 4-1 for daily span and zero checks.

References

1. Environmental Protection Agency. National Primary and Secondary Ambient Air Quality Standards. Federal Register. Volume 36, Number 228, November 25, 1971.

2. Intersociety Committee. Methods of air sampling and analysis. Washington, D.C.: American Public Health Association, 1972, p. 351.

3. Smith, F., & Nelson, A. C., Jr. *Guidelines for development of a quality assurance program. Reference method for Measurement of Photochemical Oxidants.* Research Triangle Park, No. Car.: Research Triangle Institute, June 1973. (EPA-R4-73-028c)

4. U. S. Department of Health, Education, and Welfare. *Selected methods for the measurement of air pollutants.* PHAP #999-AP-11, 1965, pp. D1-3.

REPLACEMENT PARTS DATA

When ordering parts for your Ozone Monitor, be sure to specify the following information:

- Model Number (This instrument is Model 8002)
- Your Ozone Monitor Serial Number
- Part Name
- Reference Designator
- Part Number

Parts should be ordered from:

The Bendix Corporation
Process Instruments Division
Post Office Drawer 477
Ronceverte, West Virginia 24970

Attention: B. Morrison

Telephone: (304) 047-4358

Telex: 88-5456

Should it be necessary to return the Ozone Monitor or a component to the manufacturer for repair, contact Mr. H. Henderson at the above location, prior to shipment, for information regarding costs, shipping, and estimated turn-around time. Ship with a note describing the symptoms encountered to the above address.

BENDIX OZONE MONITOR, MODEL 8002, PARTS LIST

Mod	Part Name	Reference Designator	Part Number
	Capacitors		
C		C1	007200
A,B		C1	007201
All		C2	007201
All		C3	007198
All		C4	007200
All		C5	005005-4
All		C6	005497
All		C7	005497
All		C8	007184
All		C9	007184
C		C10	44320
All	Detector Cell Assembly		5513695
	Diodes		
All		CR1	1N2484
All		CR2	1N2484
All		CR3	007040
All		CR4	007040
C		CR5	1N2484
C		CR6	1N2484
C		CR7	1N2484
C		CR8	1N2484
C		CR9	1N462
C		CR10	1N462

Parts List (Continued)

Mod	Part Name	Reference Designator	Part Number
All	Element, Sample Filter		007230
C	Fan, Cooling		007293-1
All	Filter, Calibration Sample		5514859
All	Filter, Ethylene		007590-1
All	Filter, Sample		007163
All	Flowmeter		007152
A	Flowmeter		
All	Full Scale Range Selector	S3	007141
All	Fuse	F1	
All	Gauge, Ethylene Pressure		44726-2
All	Generator, Internal Ozone		5514642
C	Holder, Calibrate Lamp	DS2	
All	Holder, Fuse		42442
C	Holder, Zero Lamp	DS3	
C	Lamp, Calibrate		NE-51
All	Lamp, Pilot		
All	Lamp, Ultraviolet		007138
C	Lamp, Zero		NE-51
All	Meter, 03 Concentration		007219
All	Micrometer, Calibrate Adjust		44626
All	Micrometer, Zero Adjust		44626
All	Mode Selector	S2	
C	PC Board, AC Current Regulator		5513085
C	PC Board, Alarm and Control Valve		5512578
All	PC Board, Electrometer Amplifier		5511082
All	PC Board, Photo-Multiplier Temp. Cont.		5513014
A,B	PC Board, 110 Volt Power Supply		5511109
C	PC Board, 110 Volt Power Supply/Regulator		5511103
All	Potentiometer	R17	44861
All	Potentiometer, Calibrate Adjust	R14	44838
A,B	Pump/Fan Assembly		
C	Pump, Evacuation		007196-1
A,B	Regulator, Constant Voltage		007194
All	Regulator, Ethylene Pressure		43468-1
	Resistors		
All		R1	RN60C1001C
C		R2	RN60C1003C
A,B		R2	RN60D1004F
All		R3	44666-6
All		R4	RN60D1004F
All		R5	RN60C5002C
All		R6	RN60C3002C
All		R7	RN60C1002C
All		R8	RN60C5001C
All		R9	RN60C3001C
All		R10	RN60C1001C
All		R11	RN60C1001C
All		R12	RN60D1004F
All		R13	RN60C3002C
All		R15	RN60C1002C

Parts List (Continued)

Mod	Part Name	Reference Designator	Part Number
	Resistors (continued)		
All		R16	RC42GF272J
All		R18	44666-7
All		R19	RC42GF220J
A,B		R20	
A,B		R21	
All		R22	RC07GF106F
C		R23	007280-1
C		R24	RC07GF122J
C		R25	RC07GF122J
C		R26	RC07GF122J
C		R27	RC07GF622J
C		R28	RC07GF622J
C		R29	RC07GF622J
C		R30	RC07GF200J
C		R31	RC07GF200J
C		R32	RC07GF200J
C		R33	RN60D1004F
C		R34	RN60D1000F
All	Switch, Power	S1	
All	Time Constant Selector	S4	44023
All	Transformer, Filament	T3	42660
All	Transformer, Power		006768
C	Transformer, Power	T4	005294
All	Transformer (UV Lamp)	T1	007139
	Transistors		
All		Q1	2N5175
All		Q2	007675 D44H2
All		Q3	006766 MJE371
C		Q4	2N3638A
C		Q5	2N3638A
C		Q6	2N3638A
A,B	Triac		A01102
All	Tube, Capillary		
All	Tube, Quartz		007187
All	Valve Assembly, Reed		
All	Valve, Diverter		5512042
All	Valve, Ethylene Solenoid		007172
All	Valve, Needle		005020-2
All	Valve, Selector Solenoid		007167
C	Varistor	R35	007568

TECHNICIAN REQUIREMENTS

In order to perform the procedures in this manual the user should have the following skills and knowledge:

1. Knowledge of the tools and materials required for maintaining the instrument sufficient to permit identifying, locating, and correctly using them. (A list of required tools and materials is included with each procedure.)

2. Ability to detect worn, corroded, dirty, broken, or otherwise defective component parts by visual, tactile, or auditory examination and comparison to properly functioning parts.

3. Ability to coordinate adjustment-screw or hand-knob movements, e.g., adjusting a knob until a desired meter reading is obtained.

4. Ability to detect leaks in tubing and piping connections using leak-detection liquid.

5. Ability to detect pinched, ruptured, or otherwise defective tubing, and incorrect tubing connections.

6. Ability to connect/disconnect standard tubing and piping connectors, achieving leak-proof connections and without injury to threads. This includes the use of teflon tape, as appropriate.

7. Ability to connect/disconnect standard electrical connectors. This includes identifying wires to facilitate correct connection, and achieving tight connections without damage to the leads or terminals.

8. Ability to use a volt-ohm meter or multimeter to achieve accurate circuit measurements without damage to the instrument.

9. Ability to solder and unsolder electrical terminals, making a good electrical and mechanical connection without shorting or grounding the connection, or damaging circuit components.

10. Ability to accurately read and interpret (using calibration curves, as required) the following:

    a. Regulator pressure gauges
    b. Flowmeters
    c. Micrometer dials
    d. Instrument meters
    e. Strip charts

11. Ability to plot a line of best fit using the least squares technique, given a step-by-step procedure.

12. Ability to make computations involving several variables, given a step-by-step procedure showing individual addition, subtraction, multiplication, and division operations.

13. The ability to handle caustic or otherwise dangerous reagents without injuring personnel, damaging equipment, or contaminating the reagent.

14. Ability to accurately obtain correct volumes of solutions using apparatus such as a pipette, syringe, volumetric flask, or burette.

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15. Ability to operate a spectrophotometer and make accurate measurements of sample absorbances.

16. Ability to assemble sample apparatus with each component in proper sequence, using butt-to-butt or tygon connections, and silicone or fluorocarbon grease as appropriate to create a leakproof assembly.